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BRITISH MUSEUM
A GUIDE
THE ANTIQUITIES OF
THE STONE AGE

THE DEPARTMENT OF BRITISH
AND MEDIAEVAL ANTIQUITIES

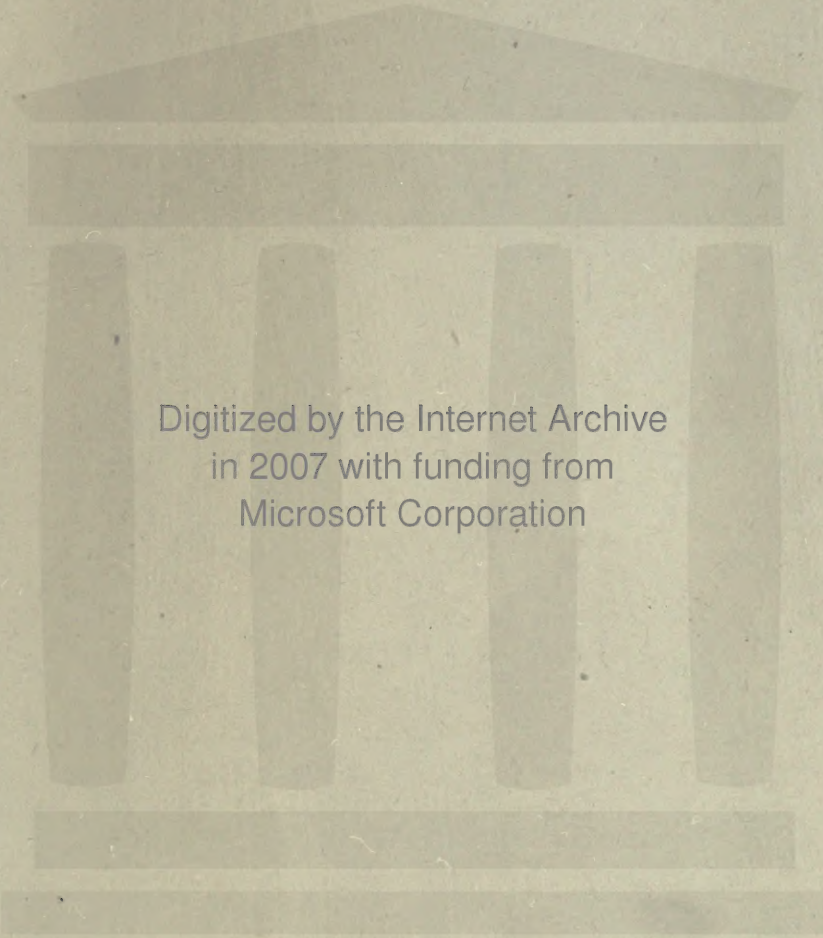
SECOND EDITION
WITH 10 PLATES AND 161 ILLUSTRATIONS

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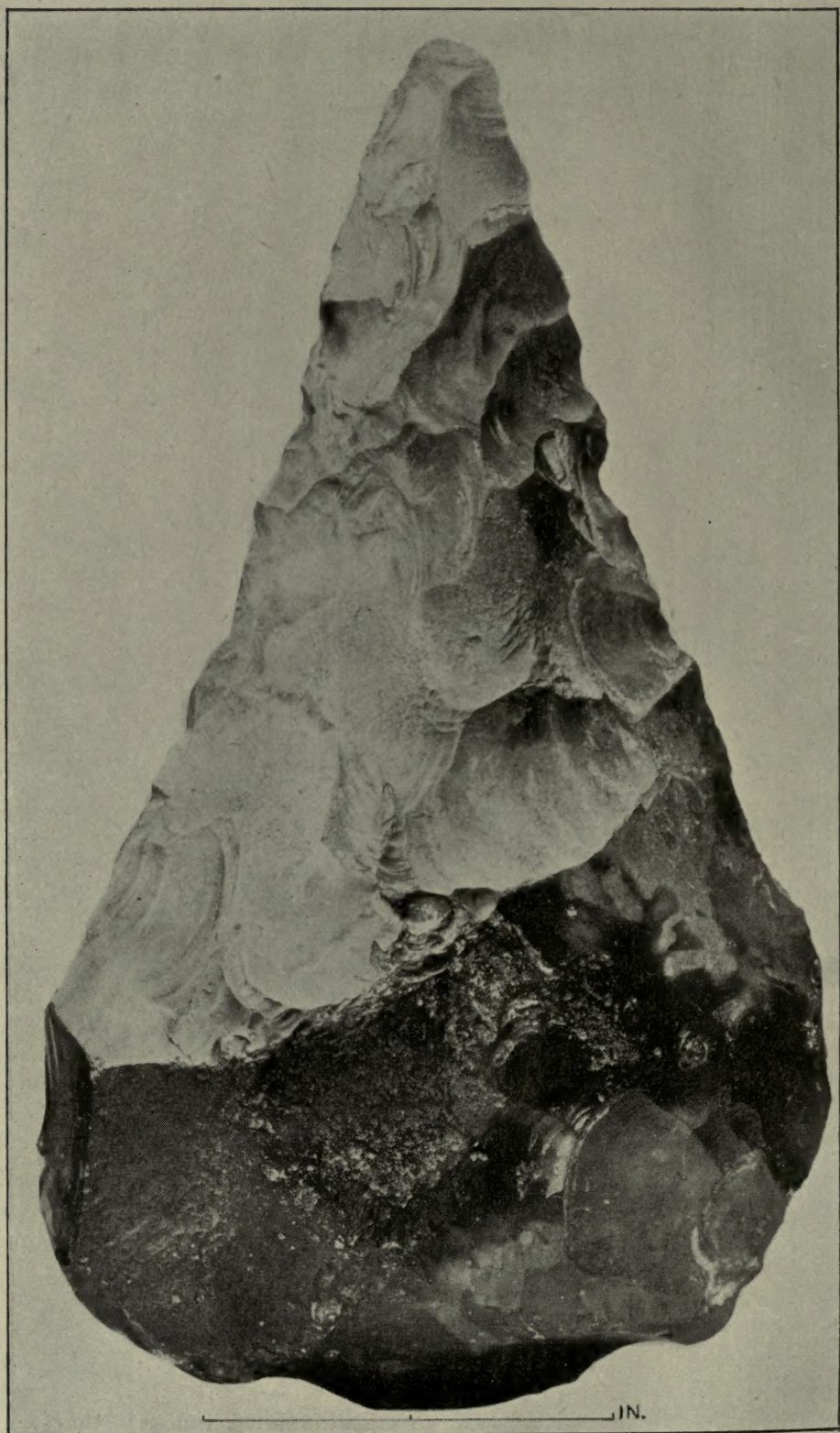


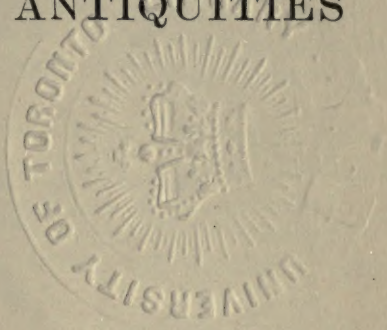
PLATE 1.—FLINT IMPLEMENT FOUND IN GRAY'S INN LANE.
(Case 105, *see* pp. 2, 26)

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BRITISH MUSEUM. *Dept. of Brit
and Mediaeval Antiquities.*

A GUIDE TO THE ANTIQUITIES OF THE STONE AGE

IN THE DEPARTMENT OF BRITISH
AND MEDIAEVAL ANTIQUITIES



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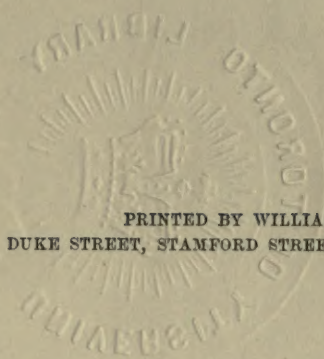
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PREFACE TO SECOND EDITION

THE first edition of this Guide was published in 1902, and the intervening nine years have witnessed many important discoveries relating to the period with which it deals, while study and research have succeeded in clearing away some of the mist that obscures the subject. The text of the Guide has been considerably revised in consequence. It would have been desirable at the same time to make some new arrangement in the collections themselves, but the limitations of space have made that impossible. A number of new illustrations have been added, and it is hoped that the volume may serve the purpose of the student both in the gallery itself and as a manual in which the main facts of prehistoric archaeology are to be found.

It should be added that stone implements from America are exhibited in the American Room, and are not included in the present Guide.

The revision has been entrusted to Mr. Reginald A. Smith, Assistant in the Department, under my direction, and I have carefully read through the proofs.

CHARLES H. READ.

DEPARTMENT OF BRITISH AND
MEDIAEVAL ANTIQUITIES AND ETHNOGRAPHY,
February, 1911.

PREFACE TO FIRST EDITION

THIS brief Guide to the collections representing the stage of culture known as the Stone Age has in many ways proved more difficult to prepare than a work of larger compass. The evidence is often so largely inductive, and for the earlier or Palaeolithic period depends to so great an extent upon geological data, that it is impossible in so short a space to do more than suggest the difficulties which surround many of the lesser questions.

Two circumstances combine to render incomplete both the Guide and the collections which it describes. In the first place many objects essential to a full understanding of these early periods are at the Natural History Branch, Cromwell Road; secondly, the collection here exhibited is very unequal. The Scottish, Russian, and German sections are by no

means adequate, while some localities and some classes of implements from England and Wales are not so well represented as they should be in the National Collection.

The convenient term Stone Age has been used throughout because it is commonly accepted and universally understood; but it must be held to denote a stage of human culture rather than a division in time. As civilization advanced, other materials came by degrees into general use without immediately supplanting the old. It is therefore possible that certain implements noticed in the present Guide were made after the discovery of bronze; on the other hand, objects from the round barrows which are usually ascribed to a people acquainted with metal have not been included, though very similar types may be observed in the neolithic section of the gallery. It is felt that the contents of round barrows would be more properly included in a separate Guide to the Antiquities of the Bronze Period.

A very large proportion of the collection is due to the enlightened liberality of Mr. Henry Christy, who, up to the time of his death in 1865, spent much of his leisure in forming an ethnographical collection, in illustration of which he acquired an extensive series of prehistoric stone implements, the whole being eventually given to the British Museum. His most important work in connection with prehistoric archaeology was the exploration of the bone caves of Dordogne, where he discovered, in conjunction with Monsieur Edouard Lartet, the wonderful drawings and carvings of the Cave period. A sense of international justice led him to desire that the finest pieces from these discoveries should be returned to France; hence, a number of carvings, as well as the engraving of a mammoth, perhaps the best example of palaeolithic art, are only represented in his own collection by plaster casts. A portrait bust of Mr. Christy stands at the foot of the spiral staircase leading from the Stone Age Gallery.

For a few of the illustrations the Trustees of the British Museum have to thank Mr. Worthington G. Smith, in whose work on primeval man figs. 8, 9, 10, 15, 17-20, 160 have been published: and the Society of Antiquaries of London for figs. 89, 122, 149, 151-5, 161. Nearly all the other drawings, as well as the plates, have been specially prepared for this Guide, and comprise a large number of objects that have not been hitherto published.

It may be added that where the illustrations are not full size, the amount of reduction is indicated by a fraction; thus, $\frac{1}{2}$ means that the original has twice the length and breadth, but four times the area, of the reproduction.

CHARLES H. READ.

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TABLE OF LATER STRATIFIED ROCKS

PERIOD	SYSTEM	FORMATION
Quaternary	Recent	Terrestrial, alluvial, estuarine and marine beds of historic, Iron, Bronze and Neolithic periods.
	Pleistocene	Peat, alluvium, loess Valley-gravels, brick-earths Cave-deposits, raised beaches Boulder-clay and gravels.
Tertiary	Pliocene	Norfolk Forest bed series Norwich and Red Crag Coralline Crag (Diestian)
	Miocene	(Not in Britain)
	Oligocene	Fluvio-marine series.
	Eocene	Bagshot beds London tertiaries.

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SUMMARY OF THE EOLITHIC AND PALAEOLITHIC AGES WITH TYPICAL SITES IN WESTERN EUROPE.

	Periods named after sites.	Characteristic forms of flint implements.	Classification.	Geology.
FRANCE	La Madeleine . . .	Long blades and minute tools, borers, etc.	Caves and Shelters	Upper quaternary
	Solutré . . .	{ Points with shoulder on one side (<i>pointes à cran</i>)		
	Aurignac . . .	{ Lozenge and leaf-shaped blades, finely chipped		
	Le Moustier . . .	{ Planing tools with steep sides, pointed blades with one edge battered Scrapers (<i>racloirs</i>) made of flakes worked on one face		
BELGIUM	St. Acheul . . .	Amygdaloid (almond-shaped) implements, finely flaked and often twisted .	River-drift, alluvium	Middle quaternary
	Chelles . . .	Hand-axes (<i>coups-de-poing</i>) often pear-shaped or flat oval, coarsely flaked		
	Strépy . . .	Nodules, flaked generally at the point . . .		
	Mesvin . . . Mafle . . . Reutel . . .	{ Nodules, not designedly chipped		
	Kent plateau . . .	Ochreous, the edges much worn by rolling, usually of the scraper form	Eolithic (Rutot)	Lower quaternary
			Eolithic	Early glacial or pre-glacial (Prestwich)

OLDER STONE AGE

By way of introduction a few words on the recognised divisions of prehistoric time will not be out of place. They must not be regarded as of universal application; though where traces of prehistoric man are found, as they are in various parts of the world, the ages (if represented at all) seem to follow in the order given below, and to betoken a similar development towards civilisation.

1. Eolithic, dawn of the Stone Age (Greek ἡώς, dawn, and λίθος, stone).
2. Palaeolithic, older Stone Age (Greek παλαιός, old, and λίθος).
3. Neolithic, later Stone Age (Greek νέος, new, and λίθος), ending in Northern Europe about 2000 B.C.
4. Bronze Age, ending in Europe between 1000 and 500 B.C.
5. Early Iron Age, represented in Britain by the Late Keltic, Early British, or pre-Roman culture.

The first division is not accepted by some and differently interpreted by others, but has been prominent in recent years, and must be given a place in the prehistoric scheme for the sake of completeness. The titles of the second and third ages proposed by Sir John Lubbock (now Lord Avebury) are now universally adopted, and other Guides in this series deal with the ages of Bronze and Iron in the light of the Museum collections. The convenience of the above classification has been proved by experience, but a word of caution is necessary for those who are not well acquainted with prehistoric remains. It should be remembered that in the Bronze Age flint and other stones were still in use for several purposes, and the Iron Age evidently did not put an end to the manufacture and use of bronze. The various titles merely indicate the material principally used at the various periods, and the lines of division must of necessity be somewhat arbitrarily drawn.

The conditions of man's existence upon the earth during the early stages of his history are shrouded in great obscurity; and though many points may now be considered as fairly established, a great deal still remains in the region of hypothesis. Implements of chipped flint are generally regarded as the earliest traces of the human race, and these are commonly found at various depths in the gravels of the present river system. Palaeolithic implements

had no doubt frequently been found before it was recognised that they belonged to a remote prehistoric epoch ; but the first recorded discovery of the kind was made in England towards the end of the seventeenth century. A fine pear-shaped implement (frontispiece, Case 105) was 'found with an elephant's tooth opposite to Black Mary's, near Grayes Inn Lane, London,' and was described as a British weapon. The true significance of worked flints was not, however, recognised till a century later, when Mr. John Frere, in describing his discoveries at Hoxne, Suffolk, in 1797, referred these implements 'to a very remote period indeed, and to a people who had not the use of metals.' No remarkable discoveries appear to have been made from that time until about sixty years later, when M. Boucher de Perthes discovered in the gravel deposits of the Somme Valley at Abbeville large quantities of implements evidently fashioned by the hand of man. From that time the existence of similar deposits has been established over a large area, and a close connection noticed between these relics of human workmanship and bones of animals many of which are now either extinct or living only in remote latitudes.

The discussion as to the meaning and age of the implements found at Abbeville raised the whole question of the antiquity of the beds containing them ; and a short recital of the evidence then brought forward will show what are the grounds for attributing a very high antiquity to these products of the human race.

That the implements are at least as old as the beds in which they occur is shown both by the condition of the chipped surfaces, which are altered in the same way and to the same extent as the unworked flints in the same bed, and by the signs of rolling to which many of them had been subjected previous to the deposit of the gravel where we now find them embedded. It has been objected that the presence of mammalian remains does not prove that animals now extinct were living while the beds were being deposited by the torrential rivers of that epoch ; but the repeated discovery of parts of the skeleton in their natural relation to each other shows that the flesh was still on the bones when the carcase sank in the water, and that we have not to do with stray fragments washed out of an older stratum. It may be taken, therefore, that the remains of extinct mammals serve to date the implements found in association with them (Case 104), and that the determination of the relative age of the gravels is a fair criterion of the period that has elapsed since the mammoth and rhinoceros haunted the valley of the Thames, and man was compelled to face them armed only with weapons of flint.

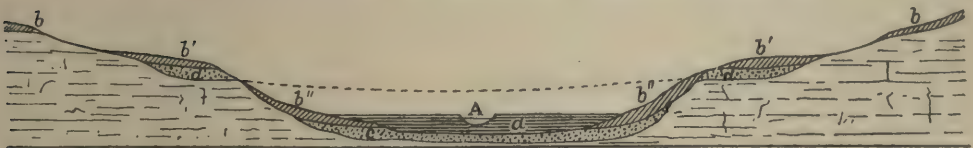
The sands, loams and gravels in which these implements are commonly found may be roughly divided into (i) glacial drift, deposited at a time when icy conditions prevailed, and (ii) post-glacial or river drift, deposited at a later period, when the glacial

conditions had either passed away or been modified. It is often, however, difficult to distinguish these classes ; and, apart from the plateau gravels (the origin of which is still obscure), it is usual to speak of the gravels connected with the present river systems as river-drift.

Palaeolithic implements have been distinguished from the productions of the later Stone Age (sometimes ground and polished) by calling the former the ' river-drift ' type, a term that serves to indicate the geological position of most of the specimens. The gravel beds are found in terraces up the sides of river-valleys, and were deposited at different periods by the river, to which must be attributed a much greater carrying power than it now possesses. It will be evident from the accompanying diagram (fig. 1) that the higher terraces were formed before the lower, and consequently the higher the position of the terrace-gravels the greater must be the antiquity of the implements contained in them, supposing no disturbing agencies to have been at work.

It is interesting to note that what are considered the oldest

FIG. 1.—SECTION OF RIVER-VALLEY, SHOWING TERRACES.



- | | |
|--|------------------------|
| A. Present river. | a. Recent alluvium. |
| b, b', b''. Brick-earth on different levels and of different ages. | d. High-level gravels. |
| c. Low-level gravels. | |

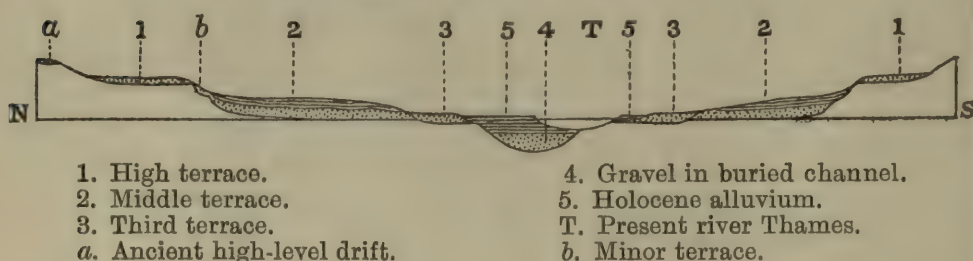
flint instruments found in France occurred in gravel very little above the bottom of the present valley. This was at Chelles-sur-Marne, about eight miles east of Paris, where three successive layers of gravel surmount the tertiary deposits. The lowest of the three contained fossil bones of *Elephas antiquus*, *Rhinoceros merckii* (often called *leptorhinus*) and *Trogotherium cuvieri*, all of which occur among the earliest pleistocene mammals ; in this deposit the implements were unrolled, and there was no trace of the mammoth or woolly rhinoceros. Above this was a bed with water-worn pebbles and bones of the mammoth, while the uppermost bed was sandy gravel containing erratic blocks, flint implements of the later type, such as occur in the cave of Le Moustier, and remains of the ox, horse, and deer.

The implements of the lowest bed at Chelles are rougher than those found above them, and the fauna justifies their attribution to an earlier date ; hence it is clear that the oldest types are not always found in the high-terrace gravels, but that the valley

was practically cut to its present depth at the opening of the quaternary or pleistocene era. Though implements lying in the bed of the river when the major valley had been cut (shown by the dotted line in the diagram) would naturally seek a lower level as the valley deepened, and might thus eventually rest on the lowest terraces, it is still difficult to see how they could have escaped considerable rolling in the interval; and the discovery at Chelles bears witness that the earliest did so escape, though subsequent deposits contained implements evidently of later date that were much water-worn.

The terraces, which are often observed on a river's banks, may be due in some measure to the unequal hardness of the beds through which the river bed has been cut, but it is now maintained by leading geologists that they are principally due to the varying erosive power of the river consequent on earth-movements. Other things being equal, the higher the land the greater is the rainfall and the steeper are the drainage slopes.

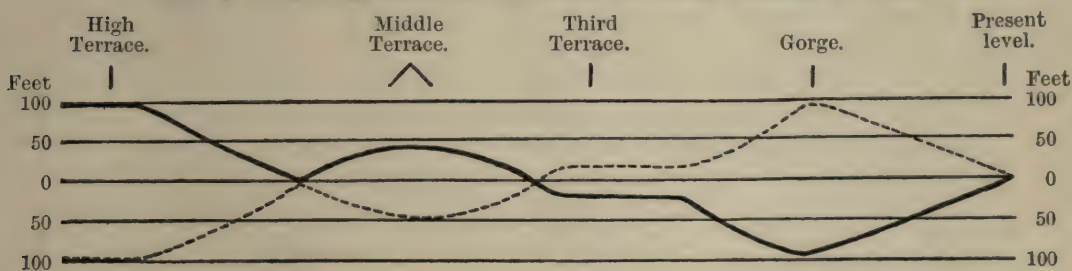
FIG. 2.—SECTION OF LOWER THAMES VALLEY, WITH TERRACES
(after Messrs. Hinton and Kennard).



Increased volume of water combined with steeper gradients would result in more active erosion of the channel; and the terraces are regarded as marking intervals between periods of maximum erosion, the latter being represented by the steeper slopes (fig. 2). The Thames is a good example of these phenomena, and the accompanying diagram (fig. 3) shows how far the bed has been raised and lowered in recent geological times by earth-movements and the action of its own stream. The altitudes given are only approximate, but it may be taken that the highest terrace, 130 feet and more above present sea-level (zero in diagram), formed part of a very ancient bed of the Thames when the land was correspondingly lower. An elevation of about 30 feet ensued, and the centre of the river-bed was rapidly eroded to the base-level, represented by the 100-ft. terrace (the high or upper terrace). An elevation of 90 feet and subsequent erosion to base-level produced the middle or 50-ft. terrace, the middle portion of that bed being eroded another 20 feet by an upheaval of corresponding extent. After an interval represented by the

10-25-ft. terrace, there was again an upheaval of the land, and to reach the sea-level once more the river had to cut away 60 or 70 feet, thus reaching its lowest bed (the sunk channel) far below the present level. Since that remote time there has been a depression of the land and the river bed has been gradually filled up by silt, the stream having lost its enormous powers of erosion by the reduction of gradients along its course. As a torrent the river would not only excavate rapidly, but transport large stones which would be rolled in the process and become pebbles. As the stream slackened on approaching its base-level, smaller stones only would be carried along the bed, and eventually there would be a deposit of sand when the flow reached its minimum. On the terraces the deposits often show this succession, the coarser material below and the finer silt above, but besides the gravels there are often beds of brick-earth and mud, due to floods and other disturbing causes, which are still a problem to geologists.

FIG. 3.—DIAGRAM SHOWING CHANGES IN LOWER THAMES VALLEY.



Thick line = base level of erosion from High Terrace times. Dotted line = corresponding altitude of land above the sea (*after Messrs. Hinton & Kennard*).

The above outline is given merely to suggest the enormous antiquity of the terrace deposits and consequently of the human relics contained in them. Reference may be made to the relief-map of the lower Thames basin affixed to the wall next Case 99, where the various deposits of the Thames are indicated by colours. It must be remembered, in estimating the volume of a river in palaeolithic times, that though the upper terraces were formed and left dry (except when below the flood-level) before the deeper part of the valley was excavated, yet the river at no one period occupied the whole of the valley between the uppermost terraces; and only laid down the present expanse of gravel and brick-earth by constantly shifting its meandering course. However, the flow of water, due to extraordinary conditions in the present drainage areas, must have been enormous; and there are abundant traces of an Ice Age which would account for the great breadth of the older river-valleys. But though the melting of an ice-sheet or a system of glaciers would enormously increase the volume of a

river draining the area covered, this would only apply to certain rivers; and the great water power of others, such as the Somme, may be due to the high ranges of hills in which they take their rise, and to larger areas of drainage.

After the deposit of the tertiary beds, which indicate a gradual transition from tropical to temperate conditions, a period of intense cold set in known as the Glacial or Ice Age. For some of the time a great part of this country was sunk in the sea to a depth of at least 500 feet, and was subsequently raised to about the same height, which is about the present level. The occurrence of northern and arctic species of shells in the gravels deposited during the depression show that the climate was very severe, and that our seas contained many icebergs. The same rigorous climate continued after the upheaval, and our northern counties, with the exception of the highest mountains, were covered with a great ice-sheet, which is shown to have been 1600 feet deep near Shap, Westmoreland, by scratched rocks high up on the mountains; 2300 feet in the West Riding and the Cheviots; 3000 feet in north-west Scotland, and twice that thickness in Scandinavia. That the ice thinned out towards the south is shown by the distribution of the boulder clay, a glacial deposit which is not found south of London, but occurs sometimes in as many as four layers in East Anglia. This goes to show that there were comparatively mild periods in the Ice Age, the glaciers temporarily retreating northwards; but the subsequent disturbance of the various deposits renders a complete record of these climatic changes impossible.

That the temperature was not uniform is, however, sufficiently shown by the frequent discovery in the river-gravels, along with temperate species, of remains of animals now either extinct or living only in extreme climates. A rough classification is given below (p. 41) in dealing with cave-finds, and it is only necessary here to point out the most important associations and their succession.

Of these animals several, such as the stag, roe-deer, cave-bear, urus, horse, hippopotamus and *Elephas antiquus*, occur in the Cromer forest-bed, and are thus proved to have existed before the great Ice Age. It may be observed that all the pre-glacial animals represented at the present day point to a temperate or moderately warm climate; while later arrivals like the reindeer, musk-sheep, marmot and lemming are specially adapted to sub-arctic conditions. The earliest palaeolithic fauna indicates a warm and moist climate, and includes the straight-tusked elephant (*antiquus*), the leptorhine rhinoceros (also *Rhin. merckii*), the large hippopotamus, the trogontherium, sabre-toothed tiger and striped hyaena. Next, in a cold and wet climate, lived the mammoth (*Elephas primigenius*), the woolly rhinoceros (*tichorhinus*), the cave-bear and hyaena, and

the Irish elk; and in the ensuing steppe period, cold and dry like northern Siberia at the present day, the leading species were the reindeer, saiga antelope, ibex, musk-sheep, lemming, marmot, glutton, and the arctic hare and fox. There was probably a cycle of climatic changes, tundra, forest, steppe, and back to tundra, but the above summary fairly represents the fauna in the early, middle, and later palaeolithic period respectively.

The range of drift-type implements outside Europe has not been accurately determined, as there is seldom sufficient geological or palaeontological evidence for their date, and form alone is not an absolute criterion. Even the patina that often appears on implements may sometimes lead to erroneous conclusions, as broken specimens have been found in the Libyan desert which show very unequal weathering of the surface when the parts are joined together again. Of the types that are familiar from the river valleys of France and southern England, numbers of undoubted examples have been found; but they are specially abundant in France, and exceptional in Belgium, Germany, Austria-Hungary, and Russia. In Italy, with few exceptions, palaeolithic flakes alone seem to have been discovered (Case 139); but Spain furnishes some excellent and well-attested specimens from the neighbourhood of Madrid (Case 109) and elsewhere. Portugal and Greece have also produced examples; but outside Europe finds in Palestine, Egypt, Somaliland, Cape Colony, Madras, and certain other localities still give rise to controversy, and their palaeolithic age is by no means fully established. Specimens of this kind are therefore exhibited at the other end of the gallery (Cases 42, 43, 147-149).

The presence of the ice-sheet and of glaciers is generally recognised as a sufficient explanation of the absence of palaeolithic implements in Scandinavia, in Ireland, and the north of Britain; and English finds appear to be practically confined to the area south of a line drawn from the Wash to the Bristol Channel (see map of river-basins on wall next the western spiral staircase). The Thames is the southern limit of the boulder-clay, but the various layers of it in the eastern counties are enough to show that this area was not always ice-covered, while the country north of Leeds, for instance, was still unapproachable; and further discoveries may prove that palaeolithic man advanced considerably to the north of the line just mentioned. A careful examination of the old gravels of the River Rea at Saltley, Warwickshire, has brought to light a well-chipped implement of the Drift type, not indeed of flint, but of quartzite pebble, which suggests a connection with the implements and flakes of that material found in the lower levels of the bone caves of Creswell Crags (Cases 123, 124). Undoubted flint implements of palaeolithic type have also been found at Lincoln and at Huntow,

near Bridlington, E. R. Yorks, and another recently at Chester, but perhaps not all *in situ*; and it must be confessed that these are at present only isolated instances. Nevertheless there are sufficient reasons why implements of the Drift period should escape notice in the north, if they were ever manufactured in that region. Flint is extremely rare over a great part of the area; and where other stone is used the evidence of human workmanship is not so conspicuous. Owing to the nature of the rocks the alluvial deposits differ from those in the south, and are not so frequently excavated for economic purposes.

Whether man was living before the intense cold set in, and survived the rigours of the glacial period, has long been a subject of discussion; and much evidence has been adduced on both sides. Discoveries of actual human remains have indeed been made, both in this country and abroad, which point to a very early appearance of man in this part of the world, but till quite recently there has generally been some doubt as to the exact position in which the bones were found, if not as to the geological date of the horizon concerned.

Perhaps the most startling discovery in recent years was that of a lower human jaw below 80 feet of stratified deposit in a sandpit at Mauer, near Heidelberg, 1907. The sands belonged to an ancient bed of the Neckar, and at that level contained fossils of pliocene and early pleistocene character, corresponding in some respects to the Forest bed of Cromer. The jaw, of which a cast is exhibited at the Natural History Museum, is extremely massive, and but for the teeth, which are in good preservation, would probably have been assigned to an anthropoid ape; but the teeth prove its human origin, and the importance of the discovery can hardly be exaggerated. The conclusions drawn from the famous Java skeleton discovered by Dr. Dubois have recently been attacked and defended; but it is still doubtful whether the bones should be attributed to a gibbon-like ape or to pliocene man. A rough classification of palaeolithic human remains is given below (p. 42), but special mention must be made here of recent finds in France that can be dated with some precision. In 1908 a skeleton was found during the systematic excavation of a cave at La Chapelle-aux-Saints, Dépt. Corrèze, in a stratum 12-16 in. thick, containing flint implements and other relics of the late Moustier period. The skull belongs unmistakably to the Neanderthal type (p. 9), like that found in the same year at Le Moustier itself, in the lower rock-shelter of the cliff overhanging the River Vézère, Dépt. Dordogne. Two other human skeletons of the Moustier period have since been unearthed in a cave near Sarlat and in a rock-shelter at La Ferrassie, near Bugue, both in the prolific Department of the Dordogne.

Mention may here be made of the palaeolithic skull (probably

of a woman) from brecciated talus, found in quarrying behind Forbes' Battery under the north front of Gibraltar Rock. It is now recognised as belonging to the Neanderthal series (*Homo primigenius*, p. 42), but is exceptional in more than one respect, and more complete than is usually the case. The orbits are excessively large, the nasal aperture broad, and the face very long. The cranium is much like that of native Australians, the cephalic index about 80, the prognathism very slight, and the frontal aspect unfamiliar, the nose being unlike anything yet seen in a human being. Huxley remarked on the absence of the canine fossa, and the palate approaches that of an anthropoid ape. The skull has recently been described in English by Prof. Sollas and Dr. A. Keith, the latter having charge of it at the Museum of the Royal College of Surgeons.

The accumulation of specimens has done much to vindicate the palaeolithic date of certain finds in this country which have been the subject of much controversy. The imperfect skull found in 1888 with other human bones 8 ft. deep in ancient river gravel at Galley Hill, near Northfleet, Kent, about 90 ft. above the present level of the Thames, is now widely accepted as of early palaeolithic date, and implements from the same horizon are mostly of Chelles types. The skull is remarkably long (cephalic index about 64·5), even when allowance is made for accidental lateral compression, and is quite distinct from the brutal Neanderthal type, of which many examples are extant. It is comparatively high, with convex forehead, the eyebrow protuberances being well developed but not exaggerated; and the group to which it belongs includes the skulls from the Engis cave in Belgium, and from Brünn, Moravia; also that of the complete skeleton found in 1909 at Combe Capelle, Périgord, in a cave-deposit dating from the early Aurignac period. Some skulls of this type are certainly earlier than some of the Neanderthal type, and no doubt represent a superior race which developed into the refined Cro-Magnon type (p. 42). The quasi-simian features of Neanderthal man are also noticeable in the Tilbury skeleton found during the extension of the Docks in 1883, 34 ft. from the surface, in sand surmounted by layers of peat and mud; and also in the skull-fragment found 7½ ft. deep at Bury St. Edmund's, Suffolk, in 1884. This last was only part of a cranium, but the find was geologically interesting, as the bed was a deposit of red loam which must have been formed long before the complete excavation of the Linnet valley. It was a pocket eroded in the chalk, about 100 ft. above the level of the Lark at Fornham; and in similar pockets on the same hill palaeolithic implements have been found from time to time, and also, it is said, the entire skeleton of a man at about 8 ft. from the surface, in undisturbed brick-earth near the tusk of an elephant.

The best evidence for the co-existence of man with an extinct fauna in this country is still derived from his handiwork. Hoxne is a classical site for palaeolithic implements (p. 26), and investigations have been made there by an influential committee, with a view to settling the relation of palaeolithic man to the glacial epoch. Borings were made in an old buried river-channel which after the deposit of the chalky boulder clay (the latest glacial deposit on this site) became a freshwater lake, and on the lacustrine deposits rests the brick-earth. The following were the beds reached by the borings in Hoxne brickyard:—

1. Brick-earth with freshwater shells, wood, and palaeolithic implements.
2. Gravel and carbonaceous loam.
3. Black loam with leaves of arctic plants.
4. Lignite with temperate plants.
5. Lacustrine clay with temperate plants.
6. Sand full of water.

The work was hindered by floods at the lower levels, but the committee were convinced that the well-known palaeolithic implements of Hoxne are much later than the boulder clay of that district; and the borings show that man was separated from the glacial epoch by two climatic waves. It is, however, stated that in other districts man may be inter-glacial or pre-glacial; and there seems sufficient evidence even in East Anglia for a much earlier appearance of man than the Hoxne beds indicate (p. 30). The alternation of glacial and inter-glacial beds in East Anglia, the latter containing palaeolithic remains, as suggested by the late S. B. J. Skertchley, is not generally accepted, but is supported to a certain extent by recent research on the Continent, and by more than one reported discovery of worked flints below the boulder-clay. There is now little doubt that some palaeolithic implements, not to mention the eolithic series, were made by man in Britain before one or more of the severe glaciations represented by the boulder clays.

As the relation of man to the Ice Age is a subject of perennial discussion, a summary of recent research may here be given in order to indicate the lines on which an ultimate correlation may be reached. The remarkable results achieved by Penck and Brückner in the Alps may serve as a basis for the chronology of northern Europe, as the number of major glaciations during the quaternary (pleistocene) period must be limited, and traces of the greatest should easily be recognised in all the areas affected. Unanimity has not yet been reached, but the attention now being devoted to the subject cannot be without result.

The names of the glaciations are derived from tributaries of the Danube along which the morainic deposits are best exhibited in each case; but for English readers it is best to retain

TABLE SHOWING SUCCESSION OF GLACIATIONS AND THE PALAEOLITHIC INDUSTRIES,
ACCORDING TO THE AUTHORITIES NAMED.

Profs. Penck and Brückner.	Prof. James Geikie.	Prof. Penck and Dr. Rutot.	Dr. Obermaier.	Prof. Boule.
Postglacial, with oscillations . . .	{ Upper Turbarian Upper Forestian Lower Turbarian Lower Forestian }	Madaleine . . .	{ Madeleine . . . Solutré . . . }	Madleine, Solutré.
Würm (4th glacial) .	Mecklenburgian (depositing purple boulder clay)	Madaleine . . .	Moustier . . .	Moustier (3rd glacial).
3rd interglacial .	Neudeckian (beds between chalky and purple boulder clays)	Solutré . . .	{ St. Acheul (cool) Chelles (warm) . }	Chelles (2nd interglacial).
Riss (3rd glacial) .	Polandian (depositing the upper boulder clay)	Moustier . . .	3rd glacial . . .	2nd glacial.
2nd interglacial .	Helvetian (represented in part by middle glacial beds)	Chelles . . .	2nd interglacial .	1st interglacial.
Mindel (2nd glacial)	Saxonian (severe, Cromer till and contorted beds)	—	2nd glacial . . .	1st glacial (pliocene).
1st interglacial .	Norfolkian (Cromer forest bed, preglacial in Britain)	—	1st interglacial .	
Günz (1st glacial) .	Scanian (not in Britain)	Pliocene . . .	1st glacial . . .	

intact the South-German river names and French site-names, without any attempt to form adjectives from them, as is done with more or less success in other languages. The accompanying table would bear a good deal of elaboration if space were unlimited, but as it stands will disclose at once the principal points on which the authorities agree and differ, and will save much repetition in the following pages. Excavation of the river gravels in England has not been conducted on systematic lines, and the confusion of palaeolithic forms in these deposits has discouraged, or at least discredited, any attempt to establish a relative chronology in this country; but of recent years more than one discovery of worked flints, including certain recognised types, under one or more beds of boulder clay, has been announced, and all merit closer attention in the light of prehistoric research on the Continent.

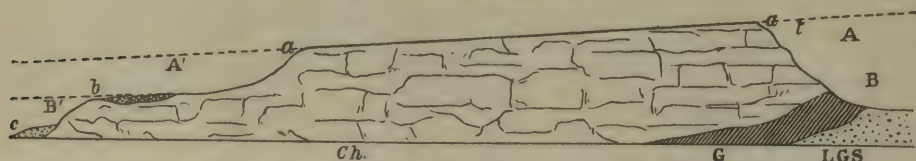
The classification of implements according to types suggests a connection between form and relative age that lends itself to criticism and is often incapable of proof, but such work as that done by M. Commont at St. Acheul will do much to restore confidence in the value of form and patination. His latest results are tabulated below (p. 34), and it need only be remarked here that, while the upper beds at St. Acheul contain flints of the type named after the site, with blanché and lustrous surfaces, the much older and ruder implements at the base of the deposit are scarcely altered in any respect. Thus patination may be accepted as a test of age, but the oldest implements are not necessarily the most patinated. In the following pages frequent use will be made of recognised French names for the various divisions of the palaeolithic period, not only because there are no corresponding English terms, but also because the French system has now been revised in the light of recent discoveries, and is the basis of all Continental classifications. It need hardly be pointed out that during the period now under consideration Britain had not been finally separated from the Continent by the Straits of Dover, and consequently the palaeolithic civilisation, climate, fauna and flora of southern England must have corresponded closely to that of northern France. To avoid confusion, reference may be made to the table of periods and types on p. 34; and a few words will give the main differences in the principal Drift types, later forms being reserved for explanation under French caves (p. 44). The 'pointed implements' of Sir John Evans include several forms that now have distinct names, but a convenient English word is needed for the implement still called by the French *coup-de-poing*. 'Pear-shaped' was suggested by Mr. Stevens, but they are not always of that form, and their use is somewhat mysterious, but as most authorities agree that they were not mounted in any way, the name 'hand-axe' may be suggested as an equivalent of *coup-de-poing*, whether of the Chelles or St. Acheul period. The former

was produced by knocking off large flakes from a core, and bringing the latter to a point, while leaving a heavy butt, sometimes with the natural crust. The edges (side view of fig. 34) are more or less wavy, due to alternate flaking on the two faces, while the St. Acheul type is more finely flaked and has straight edges (side view of fig. 17). The natural crust, if not altogether removed, is only visible in small patches, and the implement is a distinct improvement on its predecessor. Both these Drift types are flaked on both faces, and in this respect as well as others can be readily distinguished from the Moustier type of scraper, which is worked only on one face. Though occasionally found in river deposits, this belongs more particularly to the earliest Cave period (p. 44).

The proofs afforded by remains in the drift gravels, regarded in connection with discoveries in palaeolithic caverns subsequently to be described, are practically unassailable; but the evidence of man in the tertiary period has not yet been universally admitted. According to some investigators traces of his presence are to be seen in certain rudely-chipped flints found in gravels which seemed to have belonged to a river system totally unlike the present. The true nature of these flints has been the subject of some controversy, for though their tertiary age is generally conceded, it has been urged that the apparently intentional chipping has been produced by purely natural agencies. Such flints, to which the name of eoliths has been given, have been found in considerable numbers in various parts of the South of England, notably on the Kent plateau in the neighbourhood of Ightham, and a series is exhibited in Case 106 from this locality. It is not the province of the present Guide to enter into the arguments which have been brought forward against or in favour of the artificial character of eoliths, but it may be said that whether their claims can be substantiated or not, the existence of implements of a ruder kind than those of the Drift is in itself not improbable. For no invention reaches perfection suddenly, and each stage of advance is attained by an infinitely slow progress from the simple to the more complex. The majority of the Drift implements are clearly something more than the first efforts of an unpractised hand; they show on the contrary signs of a comparatively long development, and it may be fairly argued that their ruder prototypes must exist somewhere. It was only to be expected that they should have escaped notice for a longer time than the typical palaeoliths, if only because they must bear a closer resemblance to naturally fractured flints. We may draw similar conclusions from a consideration of the stone implements of the most primitive savage tribes. The knives of the now extinct Tasmanian aborigines were of the rudest description, generally chipped only on one side, and quite devoid of symmetry. The Andamanese had implements of a yet more

elementary kind, and the Semang, a similar negrito tribe of the Malay Peninsula, are said only to have stone implements in the sense that they pick up and use such convenient fragments as they may chance to find, usually employing shell, bamboo or wood to provide for their simple needs. There are, therefore, still in existence, peoples to whom, from climatic and other reasons, stone implements are of only secondary importance; and, though their civilisation is low, it must be higher than that of the earliest representatives of the human race. If, however, the negrito tribes had died out before their countries had been discovered by Europeans, the extremely rough character of their stone tools would probably have led anthropologists to reject their claims to human origin, or to assume that they were made by anthropoid apes. The search for evidence of man's existence before the drift-gravels of the present river-systems of Western Europe were deposited is at any rate justified by analogy, though

FIG. 4.—SECTION OF NORTH DOWNS, SHOWING RELATIVE POSITIONS OF PLATEAU AND RIVER DRIFT.



- a. Red clay drift, 5 to 20 feet thick, with unrolled flints from chalk, overlying thin patches of lower eocene and pliocene beds. On the surface are found eoliths, and fragments of chert and ragstone from the lower greensand outcrop. t. Position of pliocene beds.
 b. High-level river-gravel about 100 feet above the Thames.
 c. Low-level river-gravel and loam, sloping down to the Thames.
 Ch. Chalk. g. Upper greensand and gault. LGS. Lower greensand.
 AA'. Major valleys of glacial period. BB'. Later valleys.

how long before, zoology and anthropology must decide. What is quite certain is that the extreme rudeness of a chipped flint is not in itself a ground for its rejection as the work of man.

Case 106 (upper half).

The *upper part* of this Case is occupied by a representative series of eolithic flints, regarded by some investigators as evidence of man's presence here before the present river-system was formed. On the summit of the chalk downs of south-east England occur patches of drift-gravel that must have been carried by natural agencies from higher ground in the neighbourhood, and this can only have been done before the Weald district had been denuded below the level of the North and South Downs. The inclination

of the beds, as shown by the diagram in the Case, is sufficient evidence that the chalk was elevated about 2500 feet above the present surface of the Weald clay, the beds having since been

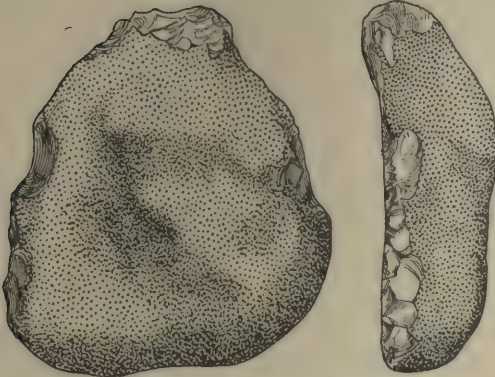


FIG. 5.—Eolith with edge-chipping, Kent plateau. [$\frac{1}{2}$]



FIG. 6.—Beak-shaped eolith, Kent plateau. [$\frac{1}{2}$]

denuded to the following respective depths: chalk, 1000 feet; upper greensand, 80 feet; gault 100 feet; lower greensand, 600 feet; and (where the Hastings sand comes to the surface) Weald clay, 750 feet. It was during this process that chert from the outcrop of the lower greensand was washed down on to the present plateau, where rolled pebbles of that formation are now found in the gravel along with eolithic flints; and as the summit of the chalk downs is now 400 to 800 feet above the sea, it is evident that these gravel deposits date back to a very remote period, when rivers flowed north and south from the watershed, at least 400 feet above their present level, and to a certain extent in a different direction, for the greensand and Thames valleys marked AA' (fig. 4) were excavated in the glacial period. The eolithic flints of the North Downs seem to be closely associated with the plateau gravel and to be confined to the area over which it extends; while their rude workmanship accords well with the early date assigned to them. The three specimens figured may be regarded as typical, and are called 'natural flint slightly trimmed at the edges' (fig. 5); 'beak-shaped implement' (fig. 6); and 'double scraper, long variety' (fig. 7).

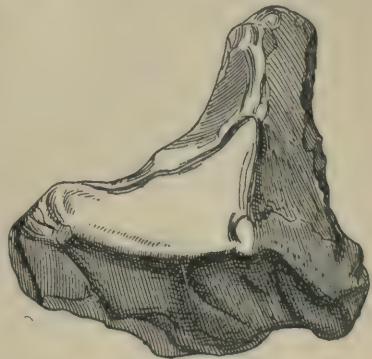


FIG. 7.—Eolithic double-scraper, Kent plateau. [$\frac{1}{2}$]

Some of the forms here exhibited present a certain resemblance to the ordinary river-drift type, but the latter is but rarely represented in the plateau gravel by well-chipped and unmistakable specimens, the proportion being about 6 per cent. of the whole number discovered; while there are 40 per cent. of slightly worked flints, and 54 per cent. of rude make. These remarks apply more particularly to the implements shown in this Case, which were collected by Mr. Benjamin Harrison on the North Downs of Kent in the neighbourhood of Ightham, and in 1904 he expressly stated that palaeoliths and eoliths had been found together only on the surface, and never in the drifts *in situ*. Several excavations resulting in numerous discoveries of eoliths at varying depths had been made in recent years, but in no single instance had a palaeolithic implement been found associated with them in a drift below the surface.

The discovery of palaeoliths in association has frequently been regarded as evidence against an earlier date for eoliths, but it could hardly be contended that palaeoliths (frequently of an advanced type) afforded a date for the deposits *on* which they are found; and the main problem has all along been to account for the presence of even one humanly worked implement in undisturbed drift that was deposited before palaeolithic times, perhaps in the pliocene period. At a depth of $7\frac{1}{2}$ feet the drift is stated to yield no implements but eoliths; but the specimens here exhibited are not on the whole more deeply patinated than the palaeoliths from the same area which are ranged on the *top shelf*.

Though the North Downs of Kent must be regarded as the classical site for eoliths, as they formed the subject of Professor Prestwich's well-known memoirs, several other localities in England are known to have produced flints of eolithic character. Immediately below the *middle shelf* are arranged specimens of eolithic appearance found by Rev. H. G. O. Kendall in Herts and Wilts, one site in the latter county being the summit of Hackpen Hill (875 feet). An instructive series is exhibited in Salisbury Museum; many have been found in that neighbourhood, and specimens have been collected near Eastbourne, Sussex, in Hampshire, in southern Essex, in the Berkshire hill-gravels, as well as at Lenham, Canterbury and West Wickham in Kent.

Case 99.

Objects from the palaeolithic area explored by Mr. Worthington G. Smith, at Caddington, near Luton, on the boundary between Hertfordshire and Bedfordshire.

Caddington stands upon the chalk, which is here capped with brick-earth and stony clay; and in the brickyards (500 to 600

feet above ordnance datum) a gently undulating streak was observed from 4 to 13 feet below the surface. The discovery from time to time of flint implements on this line led to the conclusion that here was a level on which palaeolithic man lived and worked. In some cases two levels were noticed about 2 feet apart, and though these may have coalesced in other spots, there was a distinction in the mineral condition of the implements from these two horizons. The lower or true palaeolithic floor furnished specimens with a grey or indigo marbled surface, while those from the upper level were whitish, inclining more to those from the floor than to another series nearer the surface. The accompanying diagram (fig. 8) shows the original land-surface AA full of narrow vertical fissures, perhaps made by the sun during a hot summer; these were filled up by brick-earth, brought down perhaps by a heavy storm of rain, and a new surface was formed at BB, on which level the whitish flint implements occur. Above this is contorted drift (see diagrams on *top shelf*), which bears ochreous flint implements mostly of Chelles types. These ochreous specimens are slightly abraded, some with numerous white scratches, and have evidently been transported by natural drainage from a still higher position, where the earliest known inhabitants of these parts lived on a surface of chalk-with-flints, red clay-with-flints, and boulder clay. This was subsequently denuded, and formed a deposit several feet thick in the old valleys, now the highest ground in the neighbourhood. Thus the uppermost layer of implements is the oldest of the three, and their mineral condition, which of itself would be a fair test of age, here agrees with the evidence of geology. The relative positions of the three beds also throw light on the periods of human occupation in this district. No implement whatever has been found in the undisturbed boulder-clay, and there is little to show how long after the epoch of maximum cold these implements were left on the old land surface of the higher ground; but the implements found in the lower layers were certainly manufactured before the deposition of the upper contorted drift, which doubtless indicates a cold period after the settlement of this area by man.

An interesting corroboration of the sequence thus established is the occurrence of a re-chipped ochreous implement on the palaeolithic floor. This is a solitary instance, and it is evident

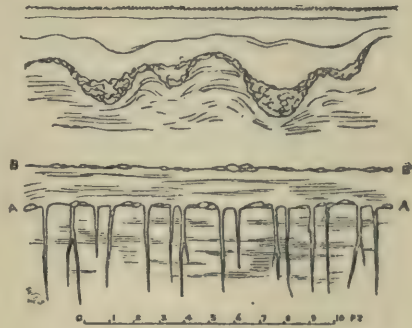


FIG. 8.—Section through palaeolithic land-surface at Caddington.

that an old implement had been found by palaeolithic man in the brown stony clay and re-pointed, only to be abandoned at the advance of flood-waters which enveloped that and other human relics in a layer of brick-earth without shifting their position. It is this that gives a special interest to the discovery, for the heaps of raw material, the finished implements, the rough flakes, the cores and hammer-stones are found practically as palaeolithic man left them; and these remains show that there was at least on the lower or true palaeolithic floor a regular flint-working place. Hundreds of flakes have been fitted together again in their original positions, and in one case all that was missing of a large block was the centre, which, by pouring in plaster, was found to be of a form commonly met with among palaeolithic implements.

As the sequence in time of the three series of implements is fairly established, it may be noticed that the earliest contained no small scrapers, and closely resembled the ordinary ochreous specimens found in the drift gravels on the terraces of the Thames, where the Chelles period is well represented.

The implements from the palaeolithic floor, which were not rolled like the earlier ochreous specimens, and have thus retained their sharp edges, are of a more miscellaneous character, comprising pointed and oval forms, delicately chipped scrapers, hammer-stones and punches, the majority bearing a strong resemblance in form and colour to the later forms of the middle series at St. Acheul (Acheul II.); other characteristic specimens are known as 'side-scrapers,' and resemble some from High Lodge, Mildenhall, generally known as the Moustier type. Such scrapers, worked on one face only along the side (French *racloirs*), occur with a white or bluish patina in the upper gravels at St. Acheul.

Somewhat different are the remains found on a palaeolithic level at Stoke Newington (see diagram at top of this Case, and objects in Case 100), where man was living when the river Lea was 20 feet higher than at present, and flowed in a much flatter and more marshy valley. The higher ground flanking the river is capped with gravel which rests on the London clay, and is covered for the most part with the contorted drift, which here and there has been denuded. Where the palaeolithic level thus crops out on the surface, entirely unabraded implements have been found; and their condition is enough to show that they were not made on the surface as we now see it.

The palaeolithic floor has been traced at Stamford Hill and Kingsland, in the City of London at 70 feet above ordnance datum, and at Highbury. The first implement from the floor was found in a river deposit at the 80-feet level, and 22 feet below the present surface. Many implements too have been found on the

east bank of the Lea, though the palaeolithic floor has there been pushed away by the contorted drift, or otherwise denuded. It may, however, have originally extended by outliers over the greater part of East Middlesex into Herts as far as Hertford and Ware, to Luton, Dunstable, Caddington and Hitchin, and possibly in patches on both sides of the Thames from Oxford to the Nore.

The palaeolithic floor which extends over several miles in north-east London and even crosses the Lea, belonged not to the Lea valley, but to that of the Thames, as is shown by the bedding of the river-deposits; and as a similar deposit of brick-earth occurs in the neighbourhood of Brixton and Clapham on the south, it is clear that at some time or other the river flowed over a valley 7 or 8 miles wide at this point. Between Highbury and Clapham, both of which at different periods were on the actual banks, the valley is over 5 miles wide.

The floor itself consists of a layer of some 5 or 6 inches of sub-angular ochreous gravel, but in some places is only visible as a line of slightly contrasted colour. The gravel contains numerous unabraded implements and flakes of Chelles character and brown or blackish colour, as well as bones of extinct animals in association with them (Case 104). Below the floor, usually at a depth of 12 feet, is another bed of gravel, containing rolled fossil bones and abraded implements. Above the floor the contorted drift also contains implements, but these are all more or less abraded, and have been obviously brought from the north or north-west; and it will be remembered that even at Caddington (at 560 feet) and Dunstable (at 800 feet), where the ground falls again to the north and in other directions, the flints from the contorted drift were likewise rolled, and must have come from still higher ground that no longer exists.

It may be remarked that most of the implements belonging to the 12-ft. gravel (which is below the floor) in the London district are found between the 50-ft. and 100-ft. contour lines of the ordnance maps, 70 to 75 feet being the most productive level. Above the 100-ft. line, and below the 50-ft., examples from this gravel are somewhat rare; and this accords well with discoveries in the western suburbs. The high terrace gravels at Acton (50 to 100 feet above ordnance datum) produced implements which were wanting in the mid-terrace deposits; and the site of a palaeolithic flint-factory has also been discovered nearly 100 feet above ordnance datum at Acton, underlying the brick-earth, and about 6 feet from the present surface. Further discoveries may serve to indicate more clearly the area occupied by palaeolithic man in these parts, and the level of the land surface at that time, while the progress of geology tends to render more trustworthy our estimate of the vast interval between that time and our own.



FIG. 9.—Mode of holding hammer-stone found at Caddington. [$\frac{1}{2}$]

flint implement, and bears an impression of a mollusc-shell (*Corbicula fluminalis*) now extinct in Britain, but found abundantly in a fossil state on the floor there. On a board are two flakes refitted together, one of them having been broken in palaeolithic times and the brick-earth still remaining in the fracture (fig. 10).

On the *slope* below the main shelf are two series of implements showing the contrast between the sharp white or marbled specimens from the palaeolithic level, and the water-worn ochreous implements of the contorted drift, subsequently brought down from higher ground but themselves of earlier date.

Bottom of Case : Strings of fossils,

On the *main shelf*, at the back, are blocks of flint formed by replacing in their original position a number of flakes struck off during the manufacture of flint implements by primitive man. These all come from the palaeolithic level or floor at Caddington, and were found where they had been left by the flint-workers. In front may be noticed a hammer-stone bruised on one face, used in striking flakes from the core and held in the hand as shown in the figure (fig. 9); a flint implement, also from the palaeolithic floor, with a minute flake replaced, showing that the brick-earth was deposited with the least possible disturbance of the flakes lying on the original land-surface; and a piece of fossil antler, from Little Thurrock, Essex, which appears to have been cut by a



FIG. 10.—Flint broken in palaeolithic times, Caddington. [$\frac{1}{2}$]

the *Coscinopora globularis*, possibly used as necklaces in palaeolithic times: the perforations are natural, but in some cases the orifice has been artificially enlarged. On two boards are flakes still incrustated with the brick-earth in which they were found at Caddington.

Cases 100, 101.

Implements found in the drift gravels of England, chiefly from the home counties.

Top slope: Palaeolithic implements of various types from Thetford and Broom Hill, Weeting, Norfolk, also from Santon Downham, Suffolk: these should be viewed in connection with other specimens from East Anglia in Case 103.

A series from Farnham, Surrey; and from Caversham, Oxon, where flat ovate and other examples have been found in the terrace-gravels of the Thames nearly 60 feet above the river.

Second slope: To the left are several specimens from the palaeolithic floor at Stoke Newington Common, the depth from the present surface being there about 4 feet. The abundant fossil shells of land and fresh-water molluscs show this site to have been close to the margin of the Thames when these implements were manufactured. Many are highly lustrous, and not water-worn; some exhibiting the curved edge mostly chipped on one side, a characteristic of the Moustier scrapers.

Two other series of implements have been found in the same locality; and the following is their supposed sequence in time:—

(a) The oldest class, found only in the deepest pits from 12 to 40 feet deep in coarse gravel resting on the London clay. These are deeply ochreous or brown in colour, rude in make and greatly abraded, and no small scrapers or fine tools are found among them. They may be compared with a specimen from Canterbury in Case 105 (fig. 19).

(b) Lustrous and slightly abraded implements of medium age, usually found in gravel at the 12 ft. level, but sometimes much lower. Both pointed and ovate forms occur, and they are generally larger than those from the palaeolithic floor above them. The chipping is better than that seen on the ochreous examples, and scrapers are found, though somewhat rarely, on this level.

(c) Flints from the palaeolithic floor, retaining their sharp edges, and comprising pointed and ovate weapons, and tools, a large number of scrapers, hammer-stones, flakes and cores.

The contorted drift which covers the palaeolithic floor also contains implements, all more or less abraded, and many whitish or mottled in colour. These implements are not later than those on the 'floor,' as they have been brought down from higher ground to the north and north-west, being carried by slowly-

moving half-frozen mud for 30 miles with a fall of at least 700 feet. As this contorted drift contains the sweepings of the hills



FIG. 11.—Flint pick,
Thames. [$\frac{1}{4}$]

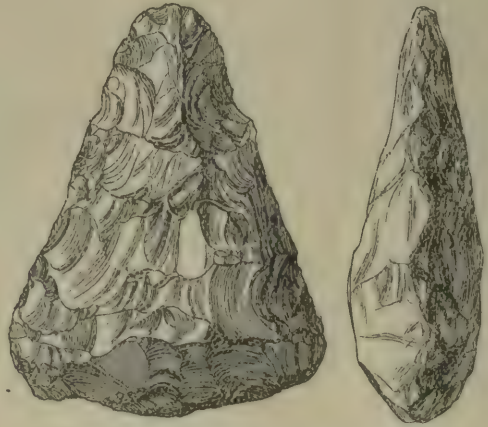


FIG. 12.—Triangular implement,
Herne Bay. [$\frac{1}{3}$]

and valleys to the north it necessarily encloses palaeolithic implements of different ages.

Other implements from north-east London are here shown; also specimens from the river gravel of the Brent at Hanwell, and the

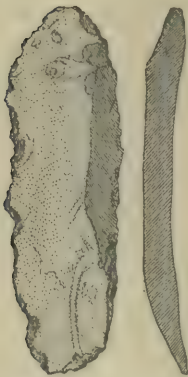


FIG. 13.—Flint
flake, Northfleet,
Kent. [$\frac{1}{4}$]



FIG. 14.—Implement, of Drift
type, Northfleet, Kent. [$\frac{1}{3}$]

upper terrace-gravel of the Thames at Acton, where in a bed 18 feet thick remains of the mammoth have been found. A fine pick (fig. 11) from the Thames should be compared with a French

example in Case 108 (fig. 27), which is called by the workmen a *ficron* (point of a punt-pole), and found in the Chelles bed at St. Acheul (p. 34).

Third slope : Specimens of various types from Kent. A famous locality is the sea-shore between Herne Bay and Reculver, where implements are often found at the foot of the cliff which have dropped from the gravels at the summit overlying the lower tertiary beds ; they are more or less water-worn, according to the time they have been exposed to the action of the waves. One which is triangular in form is here figured (fig. 12), probably of late St. Acheul date like those from Coussay-les-Bois (Case 109) ; also a large worked flake (fig. 13) and a shoe-shaped implement from Northfleet, Kent (fig. 14).

Bottom slope : A number of specimens from Reculver and others from the gravel at Milton Street, near Swanscombe, Kent, 100 feet above the Thames ; in one of the pits in this neighbourhood was found the Galley Hill skeleton, which is now widely accepted as belonging to the early palaeolithic period (p. 9).

Case 102.

Top slope : A series of chert implements from Broom in the Axe valley between Dorset and Devon, several Chelles and St. Acheul types being represented by specimens of excellent workmanship. The material is a flinty chert which was seldom used for the purpose in districts where flint was abundant ; similar specimens from Brittany, where the chalk does not occur, may be seen in Case 108.

Second slope : Flint implements, several of large size, from Biddenham, Bedfordshire, where the drift-gravel forms a capping to a low hill about two miles long, the surface being 60 feet above the river Ouse : remains of the cave-bear, reindeer, stag, urus (aurochs), hippopotamus, woolly and slender rhinoceros, the straight-tusked elephant, mammoth, horse and cave-hyaena occurring in the gravel. Some of the implements are very massive, and the series includes some of unusual form. In the front are ochreous flints from Kempston, in the same county, one at least of which is remarkable as showing two distinct periods of flaking in palaeolithic times. In fig. 15 the crust of the original pebble is seen towards the butt-end, and the surface of the implement, as first chipped, at B : subsequent contact, probably with iron in some form, has stained this surface, which contrasts strongly with the flaking D done at some later date ; and the extent F to which the flint has been thus affected is shown by the different colour of a recent fracture E at the tip of the specimen. These and other indications go to prove that much of the patination was effected

before the implements were enclosed in the gravel, by prolonged exposure on the surface; and unequal discoloration of the two faces sometimes indicates exactly how the flint lay for an indefinite period, the patination being more thorough on the upper face.

Third slope : Implements from the neighbourhood of the Solent, among them an interesting series from Shirley, by Southampton Common, and several flat ovate specimens from Hill Head, on the east of Southampton Water, which have been much water-worn, possibly in modern times, as they have evidently come from a capping of gravel on a low cliff of Bracklesham sands.

Bottom slope : Implements from the neighbourhood of Salisbury, where discoveries have been made both in the high-level gravels at Bemerton and the lower beds, principally of brick-earth, at Fisherton. The summit of Milford Hill is about 100 feet above



FIG. 15.—Re-pointed implement, Kempston, Beds. [$\frac{1}{2}$]

the Avon, and is covered with a deposit of gravel about 12 feet thick. Specimens have also been found along the coast further westward, as at Lymington, Boscombe and Bournemouth, the gravels which cap the cliff for some distance east of Hengistbury Head being supposed to have lined the valley of a river that is now represented by the Solent.

Case 103.

Top slope : Implements with white crust from the chalky district of Dorset; a series showing good workmanship from Hitchin, on the northern border of Hertfordshire; an example in quartzite from the Lizard, Cornwall, and a series from a ballast-

pit at Kennet, Cambs, which contains various types swept from the adjoining area, all very much water-worn.

Second slope : Diagrams showing the terraces formed on the sides of a valley by erosion of the river-bed ; and the respective levels at which flint implements and bones of extinct mammals were found on the old bank of the Thames to the west of London.

The rest of the Case is filled with examples of various types from the eastern counties. In the valley of the Lark the principal sites are Bury St. Edmund's, Icklingham, Warren Hill, and Mildenhall, specimens from all of which are shown, including a large proportion of thin ovate implements of St. Acheul type, generally of small dimensions.

From the river basin of the Little Ouse, a remarkably large implement (length $11\frac{1}{2}$ in., weight 5 lb. 7 oz.) found at Thetford should be noticed ; also some massive specimens from Feltwell. At Santon Downham hundreds of implements have been found, including some of the best specimens of palaeolithic flint-work hitherto discovered ; and the series contains some interesting examples of the disc type (fig. 16), and another implement, with a speckled surface, is curved like the blade of a screw-propeller (as fig. 21). Implement-bearing gravels have also been found at Brandon and Wangford, the former place being celebrated as the principal seat of the gun-flint manufacture still carried on in this country. To this river basin also belong specimens from Broom Hill, Weeting, shown in Cases 100, 101.

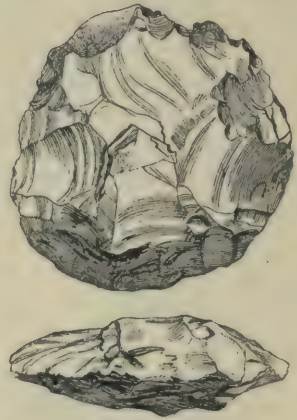


FIG. 16.—Flint disc, Santon Downham. [$\frac{1}{3}$]

The comparative abundance of the ovate type in East Anglia is remarkable, as the Thames has produced very few in proportion to its hand-axes. Thames types are on the other hand exceptional in East Anglia, except at Shrub Hill, Feltwell, Norfolk.

Case 104.

A small series of natural history specimens is here shown to illustrate the Drift period. The lower jaw of a young mammoth was dredged off the Suffolk coast, and belongs to the period when the North Sea did not exist, a continuous land surface stretching from Scandinavia to the 100-fathom line on the west of Scotland and Ireland (see map in Case 105). A molar and part of a tusk of the mammoth are also shown, the latter found with flint implements at Bedford. The earlier form of elephant

(antiquus, also called 'straight-tusked'), a survival from the tertiary period, is represented by a molar and the tip of a tusk, both from Little Thurrock, Essex, where the palaeolithic 'floor' has been traced. *Elephas meridionalis* is a tertiary species.

Below, in a box, are exhibited some interesting relics of the Drift period, showing the co-existence of man and the mammoth: a shoulder blade of the latter was found, as here arranged, on the palaeolithic level at Lower Clapton, with a well formed flint implement resting on it. At the back are two artificially-pointed stakes of birch from the site on Stoke Newington Common; and at the sides of the Case are two massive blocks of flint probably used by palaeolithic man as anvils in the manufacture of implements; one of them is 2 feet in length, weighs thirty-two pounds and was found near Isleworth.

Case 105.

Various implements of special interest are here shown together, the ordinary types having been arranged according to localities in the preceding Cases. The historic implement (frontispiece) discovered at the end of the seventeenth century with bones of some species of elephant near Gray's Inn Lane, on what was formerly the river's edge, was recognised as a piece of human handiwork, and may fairly claim to be the first of its kind recorded in this or any other country. The Dallow Farm implement (fig. 17) was found in 1830, seventeen years before the important discoveries in the Somme valley by M. Boucher de Perthes, whose portrait is shown in this Case.

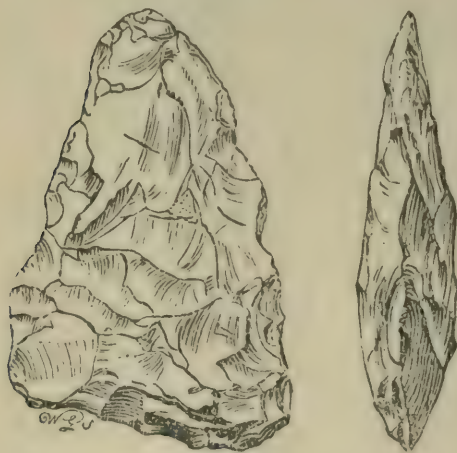


FIG. 17.—Implement found in 1830 at Dallow Farm, Luton. [1]

A few specimens of dark lustrous flint are of special interest as coming from the first site on which palaeolithic implements were collected. The diggings at Hoxne in 1797 (p. 2) showed that the gravel,

in which bones of extinct animals also occurred, was about 12 feet from the surface, below a considerable thickness of brick-earth. The Hoxne specimens are unrolled and include both Chelles and St. Acheul forms, but it is doubtful whether they all come from the same horizon.

Some flakes found at Stoke Newington Common and struck off by palaeolithic man from the same core are here shown fitted together again, as evidence that the manufacture of flint implements took place on this site, and that very little disturbance of the surface occurred when the upper beds were deposited. On the same shelf should be noticed a large chopping tool from Stoke Newington, which is well adapted to the hand as shown (fig. 18); an implement from the same locality made of quartzite, a material that was very rarely used in this part of the country; a much-rolled flat ovate specimen from Canterbury (fig. 19), which illustrates the condition in which the oldest implements were found below the palaeolithic floor (p. 19); and a grey-black flint (fig. 20), found near the surface in Drury Lane, perhaps of the



FIG. 18.—Chopping tool, Stoke Newington. [$\frac{1}{4}$]

same date as many similar examples found above the contorted drift in N.E. London. The cutting edge is on the right, and the left has been adapted to the hand, the crust being retained towards the base, and the edges still sharp. The implement has been flaked on both faces.

A coloured map shows the extent of land in north-west Europe during some part of the palaeolithic period, when the 100-fathom line marked the eastern shore of the Atlantic and neither the North Sea nor the English Channel existed. A table of stratified rocks is also exhibited here, but it is mainly from the quaternary (pleistocene and recent) beds that the present collection is derived. The red line marks the geological period of man's first appearance, according to the views most widely accepted by science. In the

adjoining Case, however, is a series of chipped flints on which have been based arguments to show that a very much earlier date



FIG. 19.—Flint implement, much rolled, Canterbury. [$\frac{1}{2}$]

must be assigned to the human race, and in the light of recent discoveries the line might be placed lower, some authorities regarding the presence of man as proved in the pliocene, miocene and even oligocene periods (table, p. vii).

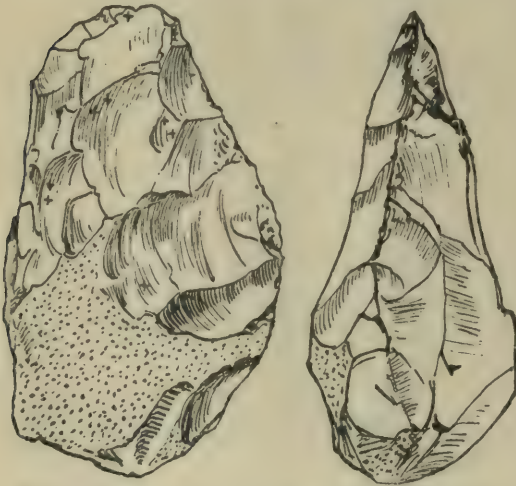


FIG. 20.—Implement with cutting-edge at side, Drury Lane. [$\frac{1}{2}$]

Below should be noticed a number of flint implements discovered since 1901 in Savernake Forest, Wilts. Some of these have a remarkable glassy surface, which is not altogether confined to the worked parts or even the worked flints, but extends over the crust on some specimens, and may possibly be due to a solution of silica deposited after the flints had been imbedded in the gravel: it is not therefore connected with the manu-

facture of the implements. The Knowle Farm gravel-pit is situated about 450 feet above the sea on the side of a river valley (now

dry) cut 40 feet deep in the chalk rock; and, according to Rev. H. G. O. Kendall, shows the following succession of deposits containing implements:—

1. Close to the surface, flaked stones of indeterminate age, and occasionally palaeoliths below the turf where it rests on river-drift.

2. In places a foot or two of 'dirt,' containing blue and white rolled and striated implements.

3. Sandy river-drift, 2-4 feet deep, with worn and striated implements, but also some sharp and unabraded in the looser part; flakes, hammer-stones, and burnt flints, and in a thin layer a large quantity of 'microliths,' or minute flakes carefully trimmed. Eolithic forms plentiful here, but contemporary with the palaeoliths.

4. Ochreous gravel, in some parts 12 feet deep, with rolled and unrolled implements at base; and comparatively few with cores, flakes, hammers and burnt stones, above.

The site has also been examined by Mr. Clement Reid, who considers that the valley has been lowered 40 feet since the gravel was deposited by intermittent floods washing angular material from the slopes above, the deposit including tertiary pebbles and greywethers. He suggests that the gravel is contemporary with the deposits of Southampton Water, Bournemouth and the Avon valley, and more ancient than the Coombe Rock of Brighton or the lowest terrace-gravels of southern England.

A chert implement from Broom (Case 102) is shown here so that the curving edges may be noticed. The dotted line (fig. 21) indicates the direction of the opposite edge, the outline of the implement not being in the same plane. This is not an unusual feature in Drift implements, but the curve is almost without exception in the form of *z* and not *s*.

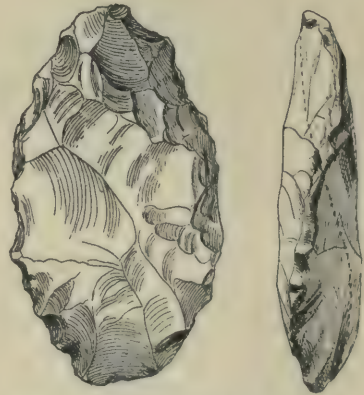


FIG. 21.—Twisted implement of chert, Broom, Dorset. [*z*]

Case 106.

The *upper part* of the Case contains eoliths and palaeoliths from the chalk plateau of Kent, which have been described above (p. 14). A coloured diagram shows the relation of the plateau-gravel to the Weald.

In the *lower part* are arranged several examples from the

eastern counties of the Moustier type of implements (figs. 22 and 24), marked by a more or less curved edge at one side (hence often called side-scrapers) and chipped for the most part on one face only. The chief locality is High Lodge, Mildenhall,

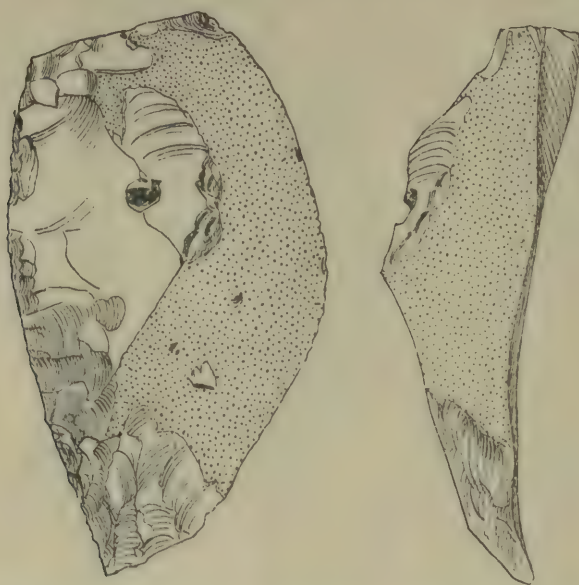


FIG. 22.—Le Moustier type of implement, High Lodge, Mildenhall. [$\frac{1}{2}$]

Suffolk, but specimens are found elsewhere, as in north-east London (Case 100), and the peculiar form suggests some connection between palaeolithic man of these levels and the oldest cave men of southern France (p. 44).

The geology of High Lodge Hill is somewhat complicated, but the accompanying section (fig. 23) will make clear Dr. Sturge's interpretation of the fact that Moustier flints are found *in situ*

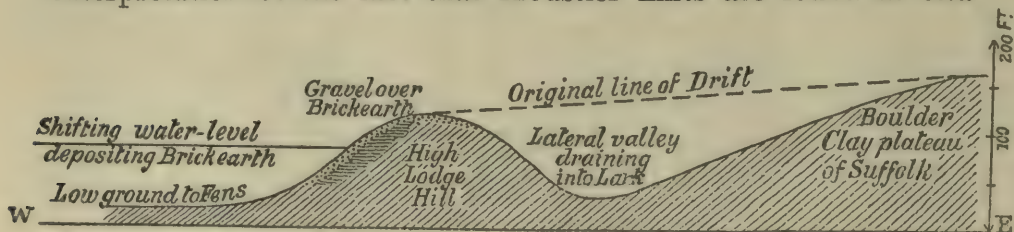


FIG. 23.—Section showing position of brick-earth at High Lodge (after Dr. Allen Sturge).

below gravel that is known to contain Drift types. It must first be pointed out that the top of the broken line of hills running south from Lakenheath between Mildenhall and Icklingham was at one time the bottom of a valley, into which the Warren Hill gravels

had been swept with thousands of flint implements. The banks were subsequently removed, and on the west the ground now slopes down into the Fens. When the latter area was drowned, water reached the slope and deposited brick-earth, on which man settled in the Moustier period. The eastern valley (draining into the Lark) was carved out later, after gravel had been pushed over the brow of the hill on top of the Moustier deposit, probably by ice, from the higher ground on the east, which is now under boulder clay; but the gravel had been on or near the top of the ridge long before it sealed up the brick-earth and its deposit of flint tools. The brick-earth reaches at least 30 feet from the surface and the flints are distributed in it, having been deposited at long intervals. They are not blunted by rolling and are of the original black colour, though some are lusted and discoloured. Except for the quality of material they are in many cases identical with specimens from the cavern at Le Moustier (p. 44). Other specimens from Bury St. Edmund's (fig. 24), with white patination, no doubt due to exposure on the surface for a long period, are here shown, with three from a site at Northfleet, Kent, which now appears to have been covered with the refuse of a flint-factory of Moustier date.

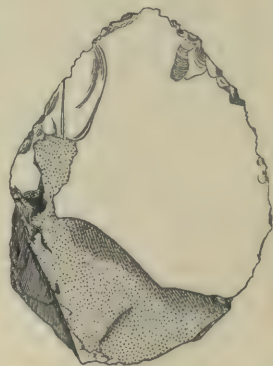


FIG. 24.—Side-scraper, Bury St. Edmund's. [4]

Case 107.

Before the French palaeoliths are described, mention must be made of flints from tertiary beds that have been thought by some to show signs of human workmanship. To the upper oligocene are referred certain split and crackled black flints found at Thenay (Loir-et-Cher), and to that or even an earlier stage of the oligocene others at Boncelles (near Liège, Belgium) of rather different character. The former (Case 113) have certainly been in the fire, but that is much more likely to be due to accident than to primitive man, and in their present condition they could have served no useful purpose. The Belgian series, however, offer striking resemblances to the implements made and used in recent times by the aborigines of Tasmania, now extinct. Specimens of the latter are exhibited in the Ethnographical Gallery. While the *Aceratherium* characterizes the upper oligocene, the *Dinotherium* marks the horizon of the Puy-Courny flints in the Cantal, attributed to the upper miocene and represented by a few specimens in Case 107. These are of a more serviceable appearance,

but their human origin is not by any means generally accepted. They are succeeded, after a long interval, by the Kentish eoliths, which are assigned by some to the mid-pliocene, and in the upper beds of that system occur the flints of St. Prest (Eure-et-Loir, France), accompanied by *Elephas meridionalis*, and the few found by Mr. Lewis Abbott in the Cromer Forest bed with the same fauna.

Adjoining the English eoliths a Belgian series, somewhat later but belonging to a similar culture, is exhibited in Case 107. These have been classified by Dr. A. Rutot, the donor, not according to their style of manufacture, which is practically the same throughout, but according to the fluvatile deposits in which the groups are found, in more than one river-valley in Belgium. The periods, named as usual after typical sites, are given in the table on p. xii, the earliest industry (Reutel) being found in the gravel at the base of the middle terrace (80-100 feet), which yielded the

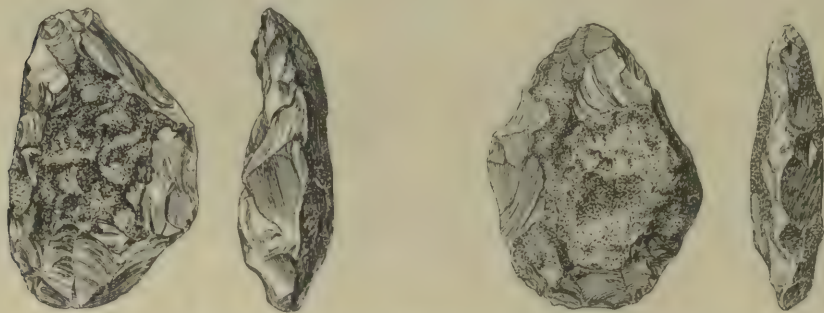


FIG. 25.—Two flints of Strépy period, Estinnes, Belgium. [$\frac{1}{3}$]

raw material in abundance. After the river had cut down to the lower terrace and deposited gravel on it, the Maffle population continued the same industry on the lower level during the first quaternary interglacial period. The next industry, named after Mesvin, is met with on the surface of alluvial deposits on the middle and lower terrace, which had both been inundated and covered with drift after being occupied by eolithic inhabitants. All these industries are devoid of implements deliberately chipped, and consist of fragments and flakes of flint adapted to the main purposes of hammering, cutting, scraping, planing and perforating. Some improvement is noticeable in the next stage (Strépy), which is the transition from eolithic to palaeolithic work, and puts an end to the long period of human stagnation. Its horizon is near the bottom of the sandy beds in the lower series, e.g. under the *sables aigres* at St. Acheul (p. 34), and here, for the first time, are found examples of deliberate flaking, a more or less successful attempt to make a certain pattern of tool out of a flint nodule.

Much of the crust was allowed to remain on the finished implement (fig. 25) without impairing its efficiency; and according to Dr. Rutot, whose views are here summarized, it was then that



FIG. 26.—Pointed nodule, Strépy, Belgium. [$\frac{1}{2}$]

weapons (as opposed to tools) first made their appearance. A primitive dagger of the Strépy period is here illustrated (fig. 26). As this is largely a geological question, it may be added that the lower quaternary belongs to the Moséen, the middle quaternary to the Campinien and Hesbayen, and the upper quaternary to the Brabantien and Flandrien horizons of Belgian geologists.

The *top* and part of the *second shelf* of these Cases, as well as the *bottom* of Cases 109–110 are occupied by a collection from the famous site of St. Acheul, a suburb of Amiens (Somme). The chalk bank of the river is cut into terraces or flat platforms (much like

fig. 1), about 50 feet and 80 feet above the river-level, that being itself 75 feet above the sea at this part of its course. On the terraces are deposits of loam and gravel, in which thousands of implements of various kinds have been found since the days of Boucher de Perthes, but have only in recent years been classified and referred to their respective horizons. The researches of Prof. Commont have added enormously to the scientific value of the finds, and encourage the hope that a corresponding stratification may some day be determined in the deposits of our own rivers. The following table gives the normal succession of strata on the terraces, though some beds are missing in certain pits owing to erosion and other accidents.

Mention must also be made of a palaeolithic 'floor' in the Tellier pit at St. Acheul, described by M. Commont. Above the chalk the deposits are here 32 feet thick (146 feet–178 feet above the sea); and at 151 feet, at the base of a bed of brown argillaceous sand (*limon panaché*) above the middle gravels were traces of an old land surface, with *Elephas antiquus* and flint implements marking the transition from Chelles to St. Acheul types (p. 34). They are of black flint with dull white patina, unrolled as generally on a 'floor,' with smaller implements



FIG. 27.—Flint pick, St. Acheul. [$\frac{1}{2}$]

TABLE SHOWING STRATIFICATION AND HORIZONS OF IMPLEMENTS AT ST. ACHEUL, AMIENS, DÉPT. SOMME, FRANCE.
(compiled from M. Commont's memoirs)

Series.	Beds with French Names.	Description of Beds.	Period.	Occurrence and Character of Implements, etc.
Upper	Terre-à-briques	Upper brickearth	Neolithic	Flints, of many forms.
	Ergeron (loess)	Lower brickearth	Madeleine	Bluish blades: planing-blades and graving-tools.
	Cailloutis	Stratified sandy loam Upper gravels	Moustier	Barren, except in intercalated bands of gravel. Bluish-white flints; Levallois flakes; hand-axes rare.
Middle	Limon rouge fendillé (sable des fondeurs)	Foundry sand	Acheul II.	Flat oval implements called 'limandes' (after the dab-fish), lanceolate and small specimens, lustrous white patina.
	Limon grisâtre à poupées calcaires	Grey loam with calcareous concretions	Acheul I.	Reddish 'limandes' (flat ovate) lusted by sand but not patinated; also small implements; grey or yellow flint, unrolled. Twisted ovate implements common.
	Sable roux (doux) à points noirs Cailloutis	Red sand with manganese specks Middle gravels		
Lower	Sable gras (terre-à-pipe)	Sticky sand (yellowish white)	Chelles	Upper part with fossil land-shells. Lower part with fossil river-shells.
	Sable aigre (or maigre)	Sharp white sand		Hand-axes including <i>ficrons</i> (long points), and implements with thick butts, unrolled and unpatinated: black or yellow lusted flint.
	Gravier du fond	Lower gravels (resting on chalk)	Early Chelles or Eolithic	Worked flakes with primary chipping, deeply patinated (orange and olive) and retaining much of the greenish-grey crust.

of unpatinated black or grey flint in the upper part of the same bed.

A general similarity will be noticed between the French and English Drift series, but particular attention is called to the picks (*ficrons*) from the lower levels of St. Acheul (fig. 27) and the Thames (fig. 11); and the various chippings and patinations of a massive implement from St. Acheul (fig. 28) and one from Kempston, Beds., in Case 102.

On the *third slope*, a small series from Bois du Rocher (Côtes-du-Nord), shows the material employed in a district where flint does not naturally occur: there seems to have been a workshop here in palaeolithic times, two kinds of cherty stone being quarried on the spot. At Vaudricourt (Pas-de-Calais) implements have been found in ancient alluvium with bones of elephants. Three



FIG. 28.—Re-chipped implement,
St. Acheul. [$\frac{1}{4}$]



FIG. 29.—Levallois flake,
Montières, Somme. [$\frac{1}{3}$]

specimens are shown from the famous site of Chelles, Seine-et-Marne (p. 3), which furnished the oldest recognized type from the river-drift, the implements being associated with a fauna that required a warm climate.

Montiers (or Montières), Amiens, four miles from St. Acheul, is specially interesting as a typical Levallois site; that is, the bulk of its worked flints are broad flakes of peculiar form (fig. 29), named after the Levallois-Perret quarter, Paris. The deposits belong principally to the upper series of MM. Ladrière and Commont, but the whole succession, from the earliest drift-types down to and including the reindeer period, has now been traced in one or other of the pits. The Levallois flakes are generally unused, but some show signs of secondary chipping or use as scrapers; and most have a white or creamy patination.

On the *bottom slope*, to the right, are examples from Marboué

(Eure-et-Loir), including a large hand-axe of triangular form broken at the butt, and a disc like those from Suffolk (fig. 16). This type is also known from Abbeville.



FIG. 30.—Chert implement, San Isidro, Madrid. [$\frac{1}{2}$]

Cases 109, 110.

On the *second slope* is an interesting series presented by M. Boucher de Perthes, found by himself in the quaternary gravels of Abbeville, the principal sites outside the town being the village of Menchecourt, the Champ de Mars, Moulin Quignon, St. Gilles, Porte Mercadé, and Mautort. In one or other of the pits the occurrence of flint implements in association with bones of the mammoth, woolly rhinoceros,

horse, urus, reindeer, cave-lion, and cave-hyaena has been placed beyond doubt, while the good preservation of delicate shells in the



FIG. 31.—Triangular implement, Coussay-les-Bois, Vienne. [$\frac{1}{2}$]



FIG. 32.—Oval implement, Coussay-les-Bois. [$\frac{2}{3}$]

same levels shows that there has been no disturbance since these beds were laid down by running water. It may be added that the

deposits at Menchecourt closely resemble those at Fisherton, near Salisbury (Case 102), and yielded implements at levels 40–50 feet above the sea. At Moulin Quignon they occurred at about 100 feet, and higher still at Mareuil.

Several flints found near Sens (Yonne) should be noticed for their patina, and another group from the Haute Garonne shows palaeolithic work in quartzite, a far less tractable material than flint.

A small Spanish series from San Isidro came from a well-ascertained palaeolithic level on the right bank of the river Manzanares, south-west of Madrid. A small plateau here is about 140 feet above the river, and it was in the drift resting immediately on the tertiary beds that the implements were found, while bones of *Elephas meridionalis*, hippopotamus, and rhinoceros were generally on a higher level. The implements are roughly chipped in a cherty flint (fig. 30). On the same shelf is a specimen from Cerveteri, on the coast of Italy, half way between Rome and Civitavecchia, and others from Prov. Chieti, all of Chelles types. The St. Acheul types are hardly represented in Italy, but Moustier forms occur, and the chronological relation to the French series has yet to be proved.

The *third slope* contains a series of worked flakes from sand-pits on the low-level at Le Pecq, near St. Germain-en-Laye, west of Paris. Here occurred a few drift-type implements which had evidently been much rolled and showed various

degrees of discoloration on the chipped surfaces. An interesting collection from Coussay-les-Bois, and other sites in the neighbourhood of Vienne, province of Poitou, contains good examples of the flat triangular type (fig. 31) and the flattened ovate (fig. 32), while from the same district come some heavier chopping tools of a deep-brown colour (fig. 33), apparently of Pressigny flint, which was largely exploited also in the neolithic period (Case 137).

On the *top shelf* is a series from the environs of Jerusalem which, though found on the surface, are held to date from the Chelles period. The similarity in form and style of work is clear from the specimens illustrated (fig. 34), but the local stone is of cherty character, frequently with black bands (fig. 35). It is possible that here and on the Egyptian desert palaeolithic man was not disturbed as in Europe by climatic changes involving a glacial period.



FIG. 33.—Drift implement, Poitou. [4]

[There are exhibited at the **Natural History Museum**, in the Department of Geology and Palaeontology, the original eolithic specimens figured by Sir Joseph Prestwich in *Controverted Questions of Geology*; and the descriptive names given by him to the various forms are furnished on the labels. His collection of flint implements, including a large number of the ordinary drift type, was presented to the Museum by his widow; and a certain

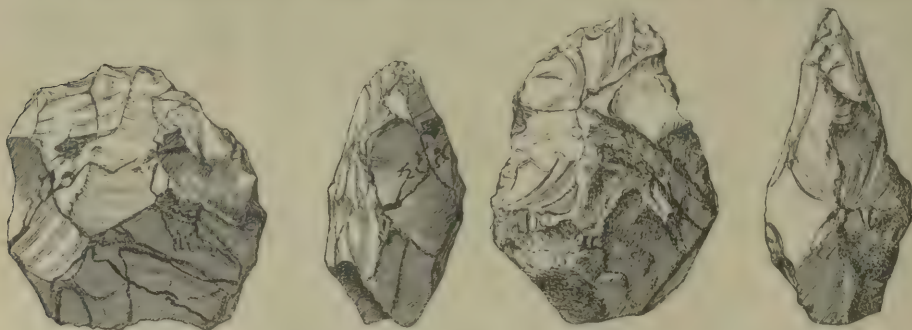


FIG. 34.—Two implements of Drift type, Jerusalem. [$\frac{1}{4}$].

portion is exhibited in a cabinet at South Kensington. In an adjoining desk-case is a series of flint implements chiefly from Milton Street, Kent, discovered and presented by Mr. F. C. J. Spurrell. Some of the specimens were obtained from various patches of gravel occurring between Bexley and Gravesend, and belonging to the deposit known as the Dartford gravel, which lies

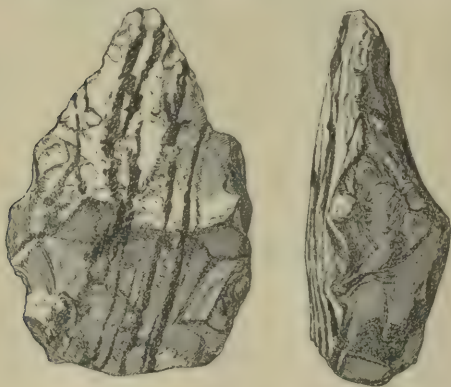


FIG. 35.—Implement of banded chert, Jerusalem. [$\frac{1}{4}$]

between 80 and 150 feet above the sea-level. The same donor has added to the collection part of the lower jaw of a woolly rhinoceros found lying on a heap of flint chips, one of which still adheres to the bone. This discovery of the site of a palaeolithic workshop at Crayford is of special interest, and should be studied in connection with the palaeolithic floor north of the Thames. The site was on an old bank of the river two miles from the present bed, and in

front of a chalk cliff against which successive floods had deposited layers of brick-earth and sand. The flint refuse was at least 36 feet from the present surface, and some reconstituted blocks are exhibited to show the manner in which flakes were struck off in the manufacture of implements.]

FOREIGN CAVES AND ROCK-SHELTERS.

THE occurrence of man's handiwork in the drift-gravels has already been discussed; but a more conclusive proof of the contemporaneous existence of man and the mammals of the quaternary or pleistocene beds is found in the caves of England, France and Belgium. The earlier researches of geologists in these ancient habitations had been undertaken chiefly for the purpose of adding to our knowledge of the extinct mammals, without any idea of man having been their contemporary. The fact that the mammoth, the cave-bear, woolly rhinoceros, and other animals now extinct had lived in these latitudes was amply proved, but the indications of man's existence were little observed because they were not expected; and when they did occur, the evidence was disregarded even by scientific men of the first rank. There can indeed be little doubt that in these investigations much evidence for the co-existence of man was unwittingly destroyed.

The Gailenreuth caves in Franconia were explored in 1774 and 1820, and the co-existence of man and the extinct animals ascertained; but the discoveries by Dr. Schmerling in the caves of Liège about 1832 perhaps did more than any others on the Continent to draw the attention of the scientific world to these momentous facts. In the forty caves examined, he met with very few human bones, but a large number of flint implements and flakes which were rightly attributed by him to human agency; and since his day many scientific investigators have accumulated evidence from a great number of sites, ranging from Gibraltar and Sicily to Switzerland and Brittany. It is, however, in France that the most important and interesting explorations have been conducted, and a representative collection excavated in the caverns of the Dordogne by Mr. Henry Christy and M. Edouard Lartet is here exhibited.

The cavern abodes of palaeolithic man are all of natural formation, but may be arranged in classes according to their geological history. The majority consist of recesses in limestone rock either produced by the erosive action of a river which has created a valley outside the entrance, or by subterranean streams that have found their way to the river through natural fissures in the rock, or have themselves formed a passage by the action of the carbonic acid contained in rain-water. In some cases the lowest beds of a cliff are wasted horizontally by water and frost, and leave behind a kind of pent-house that would afford shelter to a primitive population. In other cases deeper and isolated recesses are formed by the same means, but still consist of a single chamber with a comparatively large opening, while the action of

subterranean streams due to drainage from a higher level generally produces long winding galleries that radiate in several directions and on different levels. This last is the most common form of cave dwelling in this country, but examples of all kinds are found in France and other parts of Western Europe.

Caverns of palaeolithic date are to a large extent filled up with silt deposited either by drainage from above or by floods in the valley, on the slopes of which they are often found. The formation of stalactite and stalagmite is familiar; and it is by this means that the accumulations introduced by man and beast during successive ages have extended our knowledge of those remote times. Once the entrances were blocked, the bone-caves became practically inaccessible, and the floor was preserved from disturbance during the formation of the breccia which in many cases has sealed up the early deposits till recent times.

A reference to the sketches in Cases **118, 119**, will show that some of the palaeolithic caves are now high above the water-level, the entrances being visible on the face of the cliff sometimes (as at Les Eyzies) as much as one hundred feet above the river. That such cave-dwellings were accessible from the river banks in palaeolithic times may be assumed, especially as they were evidently flooded at times by the swollen waters of the valley. But there is not always such a difference in the water-level; for instance, at La Madeleine, the rock-shelter is but little higher than an extraordinary flood at the present day, and it is possible that some of the caverns were considerably above the water-level and difficult of access when inhabited by palaeolithic man. Though the excavation of a valley to a vertical depth of one hundred feet would in any case require an enormous period of time, yet it must be borne in mind that the volume of the rivers in this part of the world during the glacial period was very much greater than at present (p. 5); and no arithmetical calculations based on the present erosive power of a river can afford a trustworthy chronology for palaeolithic times. So far from being measured by years, the period now under discussion cannot even be accurately defined by the gradual changes of climate; for both fauna and flora are mixed to a perplexing degree.

The fauna shows diversities of habit that can only be explained by considerable variations of climate, or by remarkable powers of adaptation to extreme temperatures. All the species that occur in the river-gravels are also represented in the deposits of our bone-caves, with the single exception of the musk-sheep (list on p. 7); and though a bear's skull nearly 2 feet long may be regarded as exceptional, it is clear that such animals as the cave-lion were on the whole larger than their modern representatives. The difficulty in supposing all these animals to have been living in the same district at the same time has been fully recognised,

and various explanations have been suggested. Some of these will be briefly noticed presently, but it may be useful to give here the prehistoric fauna of north-west Europe arranged according to climate, inasmuch as the classification generally accepted proceeds on the hypothesis that there were considerable climatic changes during the cave period. What may be called the southern group comprises the lion, the spotted and striped hyaenas, and the hippopotamus; while a decidedly cold climate or a considerable altitude was necessary for such animals as the reindeer, musk-sheep, glutton, pouched marmot (*spermophile*), hamster, Alpine hare, lemming, ibex and chamois. Remains of the following temperate group have been found in caves either in England or France:—beaver, hare, rabbit, porcupine, wild-cat, marten, stoat (*ermine*), otter, brown and grizzly bears, horse, bison, urus, saiga antelope, stag, roe, fallow deer and wild boar.

The mildness of the climate in this part of the world during the pliocene age is indicated by the fauna and flora of the forest-bed which underlies the boulder clay on the shores of Norfolk and Suffolk. A gradual lowering of temperature would account for the arrival here, before the formation of the English Channel, of species from other parts of the continent; and the pliocene mammals would be gradually supplanted by immigrants adapted to a colder climate. The change was only effected very slowly and during an enormous period, nor was its progress at all uniform, as species belonging to all three groups are often found associated. In fact, they have on several occasions been found together under conditions that leave little doubt that these mixed species belong to the same area and the same period. Bones of old and young mammals, and even of birds, have been found in their natural positions, showing that the animals had died on or near the spot and had not belonged to an earlier deposit that had been subsequently disturbed. More especially are the molluscs distributed in the same paradoxical manner as the birds and mammals, and the plants afford independent evidence that species now living under different climatic conditions were closely associated in palaeolithic times.

It is, however, possible that seasonal migrations may have spared the reindeer the summer heat of southern France, and enabled the hippopotamus to escape the ice-bound rivers of a northern winter. This explanation, though far from adequate, may be supplemented by the theory of climatic changes corresponding to the advance and retreat of the glaciers, as for instance in the Alpine area, but a definitely warm climate can only be detected in the Chelles and perhaps part of the Moustier periods.

No detailed consideration can here be given of the powers possessed by many animals in a wild state, as well as in captivity, of adapting themselves to changes of climate. A few instances

may, however, be adduced to show that no hard and fast line can be drawn between tropical and cold temperate animals. To the present day the tiger with a thick woolly coat hunts the reindeer in Manchuria; while the lion thrives in the cold atmosphere of the upper Atlas range, and in the time of Herodotus must have been plentiful in Thrace. The spotted hyaena is found at an altitude of five thousand feet in the mountains of Abyssinia, and the camel survives the icy blasts of the Tibetan plateau; while the hippopotamus will still take to the water in frosty weather. This is enough to show that certain animals classed as tropical are able to bear a considerable degree of cold; and while their presence in north-west Europe during a cold period is to some extent explained by such considerations, the abnormal southern range of sub-arctic forms may be in part accounted for by the extension, over what would have been their natural feeding grounds, of glaciers such as now render the greater part of Greenland practically inaccessible.

That man lived among such diverse forms of animal and vegetable life is amply proved by the discovery of his handiwork associated with their remains in undisturbed geological beds; but his weapons and implements are infinitely more numerous and better authenticated than most of the skulls and other portions of the human skeleton attributed to palaeolithic man. Among the many discoveries of this kind on the Continent, there are, at any rate, some that convey an impression of the physical and mental characteristics of the earliest type of man known to have existed. The most instructive portion of the skeleton, the skull, has been often found in bone-caves on the Continent; the most famous example being the Neanderthal specimen, discovered not far from Düsseldorf, in Rhenish Prussia. Its extraordinary appearance led some eminent scientists to regard it as a deformed specimen; but subsequent discoveries at Brünn (Moravia), Spy (Namur, Belgium), and others more recently (p. 8), have shown that the Neanderthal skull is only an exaggerated form of a type that is characterised by remarkably thick and prominent eyebrow ridges, a low crown, and a low sloping forehead. This is in striking contrast with what is often called the Cro-Magnon type, of which three skulls are represented by plaster casts in Case III. These are much more refined in every way, and are as highly developed as the average European skull of to-day. Discoveries in cave-deposits make it clear that these two races of men, known as *Homo primigenius* and *H. sapiens* respectively, were for a certain period contemporary, the former gradually dying out or disappearing from Europe, and the other becoming our own ancestor. The superior type is characterised by a high forehead, reduced eyebrow ridges, minimum projection of the jaw (prognathism), great cranial capacity, and a well defined chin. The

development of this last feature can be traced almost step by step in extant specimens, and the fact that the Cro-Magnon chin is virtually that of our own day, emphasises the extreme antiquity of the Mauer jaw and others which are quite destitute of a chin.

The following table shows the sequence of the French cave-deposits, the characteristic forms of the various periods, and the corresponding deposits in Belgian caves, which have been excavated with much success by M. Dupont and arranged by Dr. Rutot in the Natural History Museum, Brussels. The mammoth and reindeer

	Belgian Sites.	Characteristics.	French Sites.
Reindeer	Trou du Chêne	Ornaments and haematite	
	Trou du Sureau	Flakes for piercing needles	
	Remouchamps	Beginning of pygmy forms	
	Trou de Chaleux	Mammoth and woolly rhinoceros extinct	
Mammoth period (<i>Elephas primigenius</i>)	Goyet (Pont-à-Lesse)	Moustier types rare Flint flakes largely used Harpoons of bone and antler, bone needles, ornaments	La Madeleine
	(Wanting)	Deposit of 'limon Brabantien' (loess) in Belgium	
	Trou Magrite	Flint hand-axes cease Flakes and tanged lance-heads Sculpture and engraving begin Prelude to Solutré period	Late Aurignac (Font Robert, with tanged flints)
	Montaigle	Advanced Moustier types Bone and ivory plentiful Aurignac points and Tarté planes	Aurignac (Gorge d'Enfer and Cro-Magnon) Early Aurignac (Ivory period, <i>ébournéen</i>)
	Hastière	Moustier types: bone scarce Krapina and Taubach skulls	Le Moustier St. Acheul
	(Wanting)	Deposit of 'limon Hesbayen' (loam and brick-earth) in Belgium	Chelles
	Strépy (Drift)	Transition from the eolithic to palaeolithic forms	

periods are generally recognised, but have not the same significance in different parts of Europe. Thus in the Paris basin and the Somme valley (as at St. Acheul), the *Elephas antiquus* marks the Chelles period, and the mammoth ranges from St. Acheul I. to the early Madeleine period when it disappears, the reindeer then coming to the front, though first appearing at a much earlier date. In Belgium the mammoth covers practically all palaeolithic time, and only disappears towards the end of the Madeleine period; whereas in S. France, at Taubach (near Weimar), and Krapina (Croatia) the *Elephas antiquus* lasted well into the Aurignac period. The species usually associated with the elephants have been already mentioned (p. 6). The table begins with the latest deposits, and presents the whole of the palaeolithic period.

Cases III, II2.

On the *second* and *third shelves* are placed, at the back, boards containing flint implements from various cave-dwellings, arranged as far as possible in chronological order; the earliest being Le Moustier, where recent excavations, 33 feet lower down the cliff than the Grotto, have brought to light more remains of the same character and also a skeleton of Neanderthal type.

The cavern called **Le Moustier** is on the right bank of the Vézère, about a furlong from the river, at an elevation of 90 feet (see the drawing in Case **II8**). The level of human occupation in palaeolithic times had been covered to the depth of 5 or 6 feet by earth, which filled the grotto to the roof; and the excavations carried on by Messrs. Lartet and Christy in 1863 brought to light remains of an earlier type than any yet discovered in caves, but showing some advance on the civilisation of the Drift period. The characteristic implements of flint are mostly chipped on one face only, and have a curved scraping-edge, opposite which is generally a portion of the original crust to serve as a grip (fig. 36): these implements are occasionally found in the river-gravels of this country (specimens from Stoke Newington, Case **100**, and Suffolk, Case **106**), as well as in France; while many examples of late river-drift type also occur in the cave at Le Moustier (fig. 37).

The so-called Moustier point is not confined to this period, and was produced by the gradual reduction of the two edges by use as scrapers (*racloirs*), till they met in a point opposite the butt.

The transition from the late St. Acheul period to that of Le Moustier is well marked at La Micoque, in the Vézère valley near Tayac; and the ensuing cave-period is now called after **Aurignac**, Haute-Garonne, about 40 miles south-west of Toulouse. The 'station' consists of a small cave finally used for sepulchral purposes, and a terrace in front, overlooking a stream about 45 feet below.

Under this floor were found quantities of mammalian bones ; and at the base a layer of cinders and charcoal several yards square and 6-8 inches thick. The woolly rhinoceros and aurochs were among those that had been gnawed by hyaenas ; and marrow-bones of the herbivores were generally found split in a uniform manner, some few showing the action of fire. Teeth were found also of the cave-bear and mammoth, and reindeer-antler had been utilised for various purposes. Of these the most important as types are the lozenge points with split base (fig. 39), perhaps the predecessor of the needle ; and conical flints probably used as planes (*grattoirs Tarté*).

The cave or rock-shelter of **Cro-Magnon** is situated in the



FIG. 36.—Side-scraper,
Le Moustier. [$\frac{1}{2}$]



FIG. 37.—Implement of Drift
type, Le Moustier. [$\frac{3}{8}$]

limestone cliff overlooking the valley of the Vézère, near Tayac, Dordogne ; and was discovered in 1868 during the construction of the railway. Five skeletons were found by the labourers, but only three were preserved ; casts of the skulls are shown on *third shelf*, and are those of an old man, a male adult, and a woman who had been seriously but not fatally wounded on the forehead by a blow from a cutting instrument. The bodies had not been buried, but lay on the floor of the shelter, which was at that time only about four feet from the overhanging rock. It had been raised to this level by successive accumulations of *débris* separating the layers of charcoal and hearthstones that show human occupation at intervals. The palaeolithic date of the skeletons has been

disputed, but as *débris* to the depth of 15 or 20 feet has accumulated above the rock-ledge since the bodies were deposited below it, there is sufficient evidence for a very remote date of occupation.



FIG. 38.—Double scraper, Cro-Magnon. [$\frac{1}{2}$]

Physically these remains are of interest as showing that what is known as the Cro-Magnon race had large as well as very long heads (the mean cephalic index is 73.41: see p. 9); and the cranial capacity of the woman surpasses the average capacity of male skulls of to-day. In stature they were also above the modern average, the old man being upwards of 6 feet in height; but there are also indications, in the projecting lower jaw and broad face, of a low state of development, and the somewhat mongoloid features which have been traced in the Mentone caves as well as in other parts of western Europe, have been supposed to point to some affinity with the Eskimo or the Basques of the Pyrenees.

With the human remains at Cro-Magnon were found about 300 marine shells (specimens above), now common on the Atlantic coasts; also several perforated teeth, perhaps worn like the shells on a string round the neck. Worked antlers of the reindeer were discovered, but this animal was rare on the site in comparison with the horse; and the fauna also comprised the mammoth, cave-lion, and cave-bear, wolf and pouched marmot. A good specimen of the double end-scaper, consisting of a flint-flake rounded at both ends on one face only by use as a plane (*grattoir*) is here illustrated (fig. 38), and the typical *grattoir* Tarté is here represented by an unusually large specimen. On the shelf above is a board with bone and horn objects from the cave as well as a string of periwinkle shells (*Littorina littorea*), no doubt used as a necklace.

Gorge d'Enfer is a ravine opening into the Vézère valley a little below Laugerie, and the caves have been explored on several occasions. The date of their occupation by primaeval man is indicated by points of reindeer antler, with split base perhaps to receive the shaft (fig. 39). This is one of the main characteristics of the Aurignac period, and its presence here shows that Gorge d'Enfer was occupied in the same period and by the same race as Cro-Magnon and the Haute Garonne settlement, 120 miles due south. The conical plane also occurs here, as in the two preceding caves; and the manufacture of bone tools shows an advance on the Moustier period, when that material was scarcely used at all.



FIG. 39.—Point with split base, Gorge d'Enfer. [$\frac{1}{2}$]

The typical site of the succeeding cave-period is **Solutré**, in the department Saône-et-Loire. The Cros (Clos)-du-Charnier, as the site is called from the enormous number of bones discovered, is situated on a small plateau at the base of a limestone escarpment, and unlike most palaeolithic sites, was an open air settlement, sheltered to some extent on the north by the cliff. Remains of various stages of the palaeolithic period are here found over a very small area, and though the predominant type of flint implements (the leaf-shaped lance-head, as fig. 40) is distinct enough for purposes of classification, the site is in some ways not so typical as Laugerie Haute, which has been adopted by some authorities. Several landslips have occurred on this spot, but the relative position of the palaeolithic layers is said to have been unaltered. There are mounds of kitchen refuse, reindeer bones, and flint



FIG. 40.—Leaf-shaped points,
Laugerie Haute. [$\frac{2}{3}$, $\frac{1}{2}$]



FIG. 41.—Flint
plane,
Laugerie Haute. [$\frac{2}{3}$]

implements, but especially burnt bones of the horse, which form walls or ramparts: horse-bones also occur in large quantities around and underneath prehistoric fire-places, most of which are surmounted by interments of unburnt or partially-burnt human bodies. The evidence available points to the conclusion that the hearths, the refuse-heaps, the bone-walls and the interments with or without the slabs of limestone are all connected and may be referred to the same people and the same period, but the character of the flint-working has been held by some to point to a transition period between the palaeolithic and neolithic civilisations. The similarity of the leaf-shaped implements to specimens from Ireland (plate 10) and elsewhere lends some colour to the suggestion. On the other hand, the fauna consists of the horse, reindeer and mammoth, deer, urus, fox, wolf, saiga antelope,

and cave-lion, but the great carnivores only occur in the bed below the fire-places, and the wild boar and rhinoceros do not occur at all. There is now no doubt that it preceded the Madeleine culture and was itself divided into two periods, the earlier marked by the laurel-leaf points (fig. 40) and the later by the points with shoulders (*pointes à cran*, fig. 42).

Laugerie Haute is in many respects a more suitable type-locality than Solutré, as the remains are more homogeneous, and were found underlying a Madeleine deposit. Flint working had by this time reached a high pitch of excellence, only to be surpassed in the neolithic age; and the most characteristic form of the period is the leaf-shaped point (fig. 40), which may have been used, according to size, as an arrow-head, lance-head,

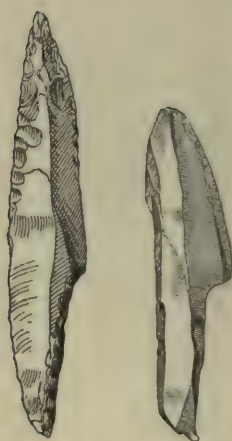


FIG. 42.—Points with shoulder, Les Eyzies. [$\frac{2}{3}$, $\frac{1}{3}$]

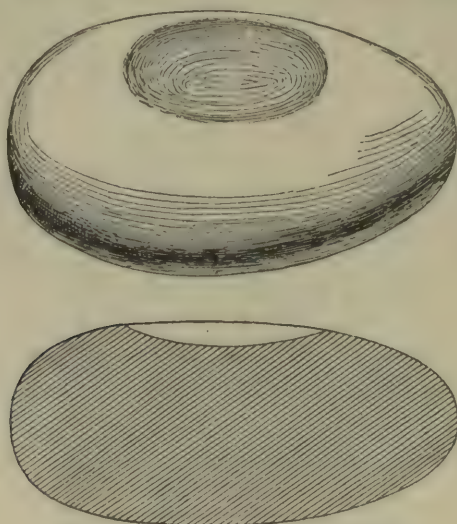


FIG. 43.—Quartzite pebble with hollow, Laugerie Basse. [$\frac{1}{2}$]

or even a knife. The flint-flakes used for scraping skins and other purposes were also finely worked and had acquired a definite form (fig. 41), rounded in use at one or at both ends by chipping on one face only. The double planes are also common in the succeeding Madeleine period, when the single ones were formed out of longer flakes.

The cave of **Badegoule** (Badegols), near Beauregard, Dordogne, faces the south at an elevation of about 250 feet above the Cerne, a small tributary of the Vézère; and on a terrace in the rock, below the cave, was found breccia resting against the cliff, while the ground in front was strewn with worked flints, bones and teeth, including those of the horse, ox, and reindeer. Some of the implements were chipped in leaf-form, and the site is classed with Solutré, though recent excavations have brought to light types

that show a transition to the Madeleine period. Several flakes used as end-scrapers are shown, and also flint cores from which blades were struck by means of hammer-stones.

The cave of **Les Eyzies**, near Tayac, Dordogne, has been considered to mark the transition between the Solutré and Madeleine periods, as the worked flints, which include the characteristic point with shoulder (fig. 42), were far outnumbered by lance or harpoon heads of the Madeleine type, made of reindeer-antler. The prehistoric site is situated in the face of the limestone cliff (see drawing in Case **119**), at an elevation of 120 feet above the present river-level; and is on the north side of the valley of the Beune, a stream that joins the Vézère about half a mile lower



FIG. 44.—Double graving-tool, Les Eyzies. [$\frac{2}{3}$]



FIG. 45.—Flint borer, Les Eyzies. [$\frac{2}{3}$]

down the valley. Les Eyzies has produced examples of engraving (Case **118** and fig. 69) of the kind more usual at Laugerie Basse and La Madeleine; and the quartzite pebbles with hollowed faces (fig. 43) are also more common in the succeeding period. Their use is uncertain; but, though it has been held that they served as mortars for grinding haematite or red ochre (specimens on *second shelf*), it is also possible that they were anvil-stones for flint-working; and similar specimens of the neolithic age found in Ireland are shown in Case **132**. Among the flint implements from this site may be noticed the graver (*burin*) with transverse chisel edges sometimes at both ends (fig. 44), used for engraving on bone or ivory; and a curious type of borer, the point of which is a narrow curve laboriously worked (fig. 45). There is

also one tanged point like an arrow-head, that is called after the Font Robert cave near Brive (Corrèze), generally considered of late Aurignac date. A block of breccia or solidified floor-deposit from this cave, showing the manner in which the relics were found, is exhibited on the floor of this room.

The rock-shelter known as **Laugerie Basse** has been explored by Messrs. Lartet and Christy and others, and is situated on the right bank of the Vézère, about 80 yards from the river, and about 25 feet above its level. Few sites have yielded more numerous examples of palaeolithic art; and the analogy to La Madeleine is rendered all the more striking by the absence of the

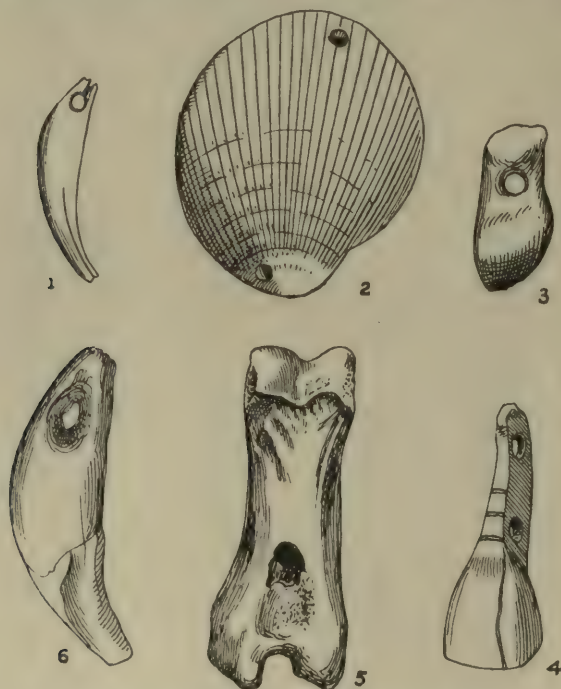


FIG. 46.—Perforated teeth, shell and bone, La Madeleine and Laugerie Basse. [3]

Solutré type of flint implements that occur in the neighbouring site of Laugerie Haute. Carved and engraved representations of the human figure have been found at Laugerie Basse, among which may be mentioned the hunter of the aurochs; but more artistic work may be seen in the sketches of animals (fig. 70) exhibited in Case 118. It was here also that the crushed man was discovered in the Madeleine stratum, and, though it has been suggested that this was a later burial, a huge boulder had evidently broken the vertebral column, and the ornaments found on the body were clearly of the palaeolithic period. Specimens of perforated teeth, etc., are exhibited from this site (fig. 46). Phalanges of the reindeer (no. 5)

are frequently found with a hole at one end, and have been considered whistles, but the bone may have been broken through at this the weakest spot by the teeth of hyaenas.

Case 113.

On either side of the Case are exhibited in glass-covered boxes remains from the rock-shelter called **Montastruc**, on the river Aveyron at Bruniquel (Tarn-et-Garonne). They form part of the large collection acquired from M. Peccadeau de l'Isle, the more important specimens being shown in the adjoining Cases **114, 115**. The classifications of the palaeolithic epochs are here shown in tabular form, together with a list of the characteristic remains of each cave-period and a comparative table of typical sites in England, France, and Belgium. On the shelf are shown a few specimens of calcined flints from a tertiary stratum at Thenay (Loir-et-Cher); but further evidence must be produced before these can be generally accepted as proof that man existed in the upper oligocene. Other alleged finds of human work in early tertiary beds are noticed above (p. 31), but are not fully represented in the collection.

The adjoining tray contains specimens of machine-made 'eoliths' from the cement works at Mantes, near Paris, where flint and chalk are separated in washing-mills. The flints are battered to some extent by rotating iron teeth and by striking against one another, so that the edges are often chipped in a manner recalling the plateau flints of Kent. The operation has been watched by several eminent archaeologists in France, and the series here exhibited was presented by Dr. Capitan, who, with many others, believes that eoliths can be explained by natural causes, especially by the action of torrents in a stony channel.

Cases 114, 115.

On *boards at the back* of these Cases are mounted objects discovered in 1863-4 by the Vicomte de Lastic St. Jal in excavating the cave-dwelling known as **Trou des Forges** on the right bank of the river Aveyron, a little above the village of **Bruniquel** (Tarn-et-Garonne). Other remains from this site are exhibited on the top shelf of Cases **111, 112**.

The entrance to this cavern is in the face of the cliff, about 40 feet above the bed of the river, the floor being composed of stalagmitic breccia, enclosing water-worn stones from the bed of the river, and also pieces of the reddish limestone of which the cliff is formed; the upper part of the breccia, 4-5 feet thick, was

black with charcoal, and the lower part, 3-4 feet thick, was plain red earth; but every part of the breccia contained remains of the wolf, rhinoceros, horse, reindeer, stag, Irish elk and bison, together with implements of flint and bone.



FIG. 47.—Flint plane and graving-tool, Bruniquel. [3]

The remains belong to the Madeleine period, and should be compared with the series in the adjoining Cases **116**, **117**. Among the flint or chert implements should be noticed a number of combined scrapers and graving-tools, rounded at one end as in the Solutré period, and pointed at the other at one side (fig. 47), perhaps for the purpose of engraving bone or horn.

Javelin-heads of reindeer-horn are common in the Madeleine period, and many are here shown either with plain points, the butts cut like a wedge for fixing in the shaft (fig. 48), or barbed like a harpoon on one or both sides (fig. 49). Some specimens exhibit remarkably fine work, but the dexterity of palaeolithic man is perhaps best attested by the bone needles of the Madeleine period found at Bruniquel and elsewhere. Specimens from the Trou des Forges and Montastruc are shown on the *second shelf*, together with tools and material used in their manufacture. A splinter was first taken from the bone (fig. 50, no. 3) and then rounded by scraping with a serrated flint (no. 5). The tapering point and smooth surface were made by rubbing with a sandstone burnisher (no. 4), and the eye drilled with a pointed flint (nos. 1 and 2). Needles of various sizes, probably for sewing skins, were thus produced (nos. 6, 7), and examples have been found showing that a second eye was sometimes drilled when the first was broken.



FIG. 48.—Points with bevelled base, Bruniquel. [1, 3]

A bone piercer (fig. 51) may have been used to perforate the tougher skins, but the Eskimo are known to manipulate hides in such a manner as to render possible a direct use of their needles of bone or ivory.

The engraved bones from this site are among the best known, and on the *second shelf* are exhibited part of a horse's rib with

three horses' heads on both sides (fig. 52); part of the rib of a deer, engraved with heads of reindeer and wild goat (fig. 53); and on the same board a portion of the wing-bone of a bird with a

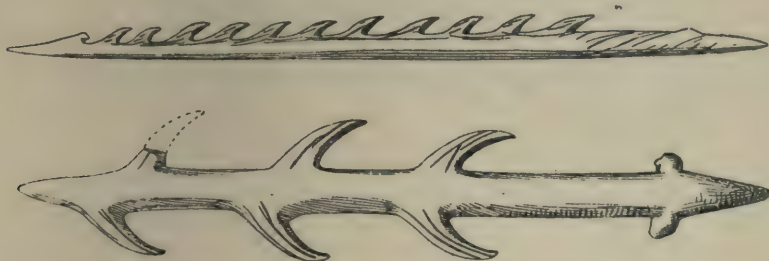


FIG. 49.—Barbed harpoon-heads, Bruniquel. [½]

reindeer's head in outline; also the drawing of a fish. On a *board at the back* are some interesting carvings in the round of horses' heads, probably portions of spear-throwers (fig. 54), such as have been found fairly complete at La Madeleine (no. 3), and are used at the present day by savage tribes on the N.W. coast of

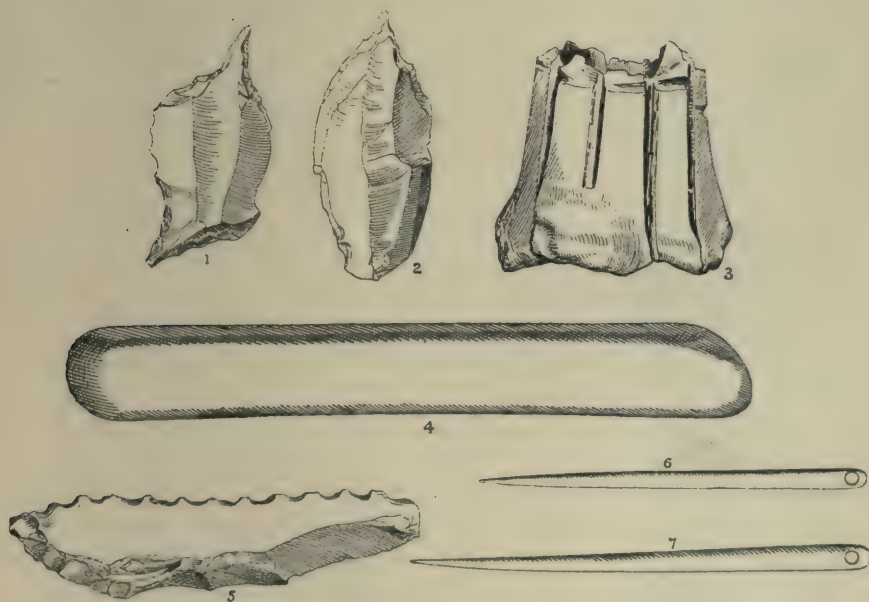


FIG. 50.—The manufacture of bone needles, Bruniquel.

America (no. 1) and Australia (no. 2). The throwing-stick is used to increase the leverage of the arm, the butt-end of the missile resting against the peg or hook. These are all from the Trou des Forges; but more remarkable examples of palaeolithic art were

discovered at the rock-shelter known as Montastruc, on the left bank of the river Aveyron, close to the village of Bruniquel.

On another board are diminutive implements (fig. 55) from Bruniquel, with the back or thicker edge blunted by chipping, perhaps to provide a resting-place for the finger when in use. This type is common in the later cave period, and known by the French term, *à dos rabattu*.

The objects exhibited here in *glass-topped boxes* are from the collection of M. Peccadeau de l'Isle, who in 1866 excavated the area at the base of the cliff called **Montastruc**, which rises nearly 100 feet above the Aveyron. The rock-shelter itself is from 20 to 25 feet above the river and about 60 yards from the bank, but is still liable to floods. The remarkable carving (plate 2) shown on the *second shelf* was found in two pieces almost together on this site; and a back view is provided by means of plaster casts. That they belong together and formed the point of a carved tusk was shown in 1905 by the Abbé Breuil, whose work on the cave-deposits, their engravings and wall-paintings has considerably increased our knowledge of later palaeolithic man. These carvings of reindeer are in mammoth ivory, and are of great artistic merit; while the mammoth (fig. 56), carved in reindeer-horn and shown on



FIG. 51.
Bone-piercer,
Bruniquel.
[1]



FIG. 52.—Engraved bone, Trou des Forges, Bruniquel. [3]

the same shelf, does not appear to be so faithful a representation. The accompanying sketch (fig. 57) is inserted to show that the trunk reaches the fore-feet; the tusks, which were for the



FIG. 53.—Engraved bone, Trou des Forges, Bruniquel. [3]



PLATE 2.—POINT OF MAMMOTH TUSK CARVED WITH REINDEER, MONTASTRUC,
BRUNIQUEL, FRANCE.
(Case 114, *see* p. 54)

sake of convenience placed along the blade, are somewhat out of place; and the blade is now missing.

On the *top shelf* is an interesting series of sandstone pebbles

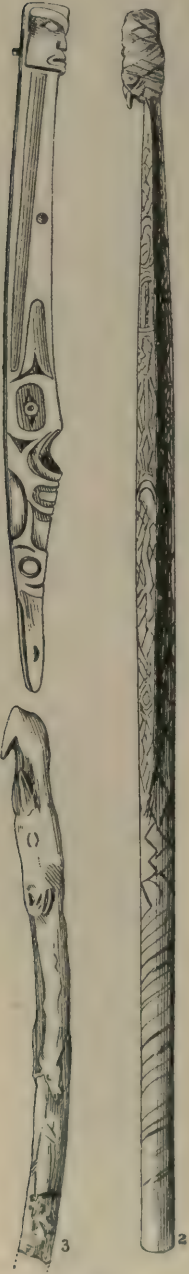


FIG. 54.—Examples of spear-throwers. [$\frac{1}{2}$]



FIG. 55.—Blade with battered back, Trou des Forges. [$\frac{2}{3}$]



FIG. 56.—Dagger-handle in form of mammoth, Bruniquel. [$\frac{1}{3}$]

with sketches made by palaeolithic man of the animals around him. For purposes of exhibition, the outlines have been filled in with white, but



FIG. 57.—Probable restoration of dagger with mammoth handle.

one specimen is left in its original condition. Perhaps the most attractive is the figure of a reindeer (fig. 58), the legs being drawn on the



FIG. 58.—Engraving on pebble, Montastruc, Bruniquel. [$\frac{1}{3}$]

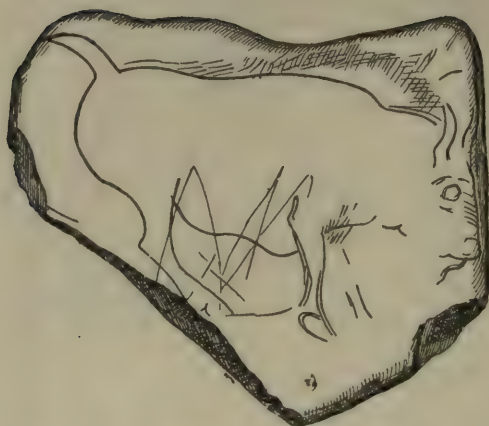


FIG. 59.—Engraved stone, Montastruc, Bruniquel. [$\frac{1}{2}$]

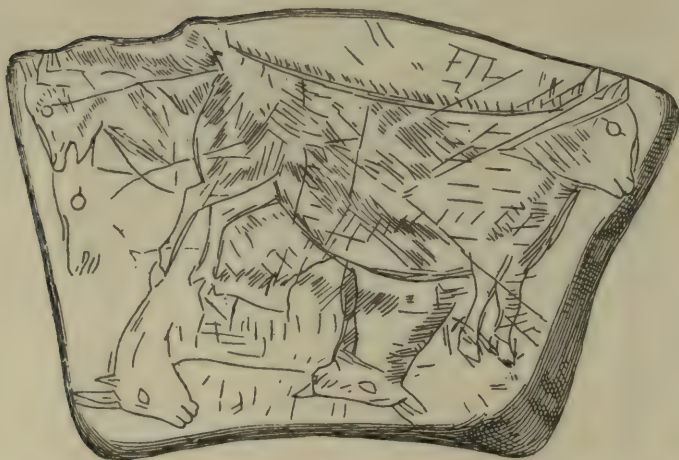


FIG. 60.—Engraved stone, Montastruc, Bruniquel. [$\frac{2}{3}$]

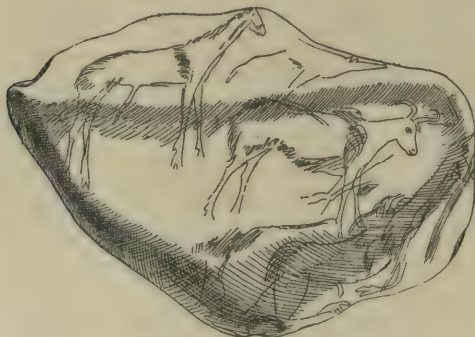


FIG. 61.—Engraved stone, Montastruc, Bruniquel. [$\frac{1}{4}$]

opposite side of the stone. The contrast between two drawings of a bovine animal should be noticed (figs. 59, 60), and the largest stone of the series has sketches of various animals, including the goat (fig. 61).

On the *second shelf* in a glass-topped box are exhibited pieces of reindeer horn showing human workmanship; and among them the figure of a horse may be noticed (fig. 62).



FIG. 62.—Horse engraved on bone, Montastruc.

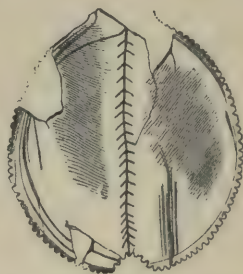


FIG. 63.—Bone ornament, Montastruc. [$\frac{1}{3}$]

On the *third shelf* attention may be drawn to a remarkable disc of horn with herring-bone engraving and serrated edge (fig. 63); it was probably a personal ornament, and may have been worn, like the perforated teeth, on a necklace, but the loop is now wanting.

Cases 116, 117.

The rock-shelter of **La Madeleine** (or, as it is sometimes written, Madelaine) has provided a name for the closing epoch of the palaeolithic Age, when the working of bone and horn was at its best, but the manufacture of flint tools and weapons had declined, being distinctly inferior to the products of the Solutré period. The settlements of the population were now sometimes in the open country, but the typical site is on the right back of the Vézère, at the foot of the cliff, and not far from the ancient castle of La Madeleine. It is about 30 yards from the river, and the upper surface of the deposit is not more than 20 feet above the level of the stream, being, like Montastruc at Bruniquel, within reach of floods. In the recess below the overhanging rock the beds attained a total depth of 8–10 feet, the upper part being principally rubble from the roof, and resting on layers of refuse resembling the kitchen-middens of a later period. The animal remains corresponded to the fauna of Les Eyzies, and interspersed with them were hearth-stones, rubbing-stones and hollowed pebbles, together with flint flakes and cores and some remarkably

long blade-scrapers (fig. 64) characteristic of this period (see specimens on *top shelf*: the *bottom shelf* contains stones similar to those just mentioned, from Bruniquel).



FIG. 64.—Flint end-scra- per, La Madeleine. [4]

The exploration of this site by Messrs. Lartet and Christy resulted in the discovery of a large number of horn implements, conspicuous among them being the somewhat mysterious *bâtons de commandement* or sceptres, formed of an antler with one or more circular holes (fig. 65), and supposed to have been emblems of authority or magicians' wands: many of them have engravings of animals, especially the horse (fig. 66). A number of small pieces of reindeer-horn on the *second shelf* also have representations of animals such as the reindeer (fig. 67), and possibly of the human arm (fig. 68); also specimens with geometrical and other designs, the 'bamboo' pattern being shown in fig. 65. At the end of this shelf are lithographs of some of the more important engravings in this and other collections; and many of the objects from this site generously

given by Mr. Christy to the French Museum of National Antiquities are represented by casts on the *third shelf*.

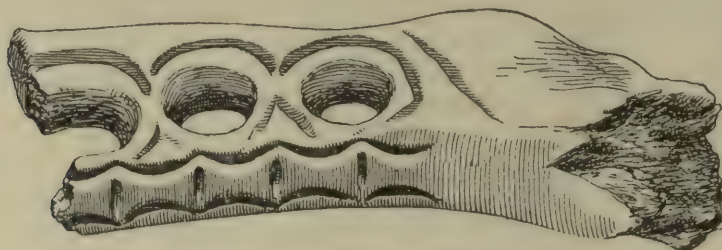


FIG. 65.—Part of 'sceptre,' reindeer-antler, La Madeleine. [3]

The following division of the Madeleine period has been suggested by the Abbé Breuil, and is based on changes in the industry:—

1. Lower, without harpoons, some needles (fig. 50), ornamented



FIG. 66.—'Sceptre' of reindeer-antler, La Madeleine. [4]

bone plates (fig. 63), chisel-ended lance-heads (fig. 48), and flint-work resembling upper Solutré.

2. Middle, with harpoons, generally one row of barbs (fig. 49); harpoon and lance-heads with forked base; half-round antler ornamented with figures; end-scrapers (blades) and graving-tools (fig. 47), the sides rarely retouched. Represented at Bruniquel and Laugerie Basse, and corresponding to Piette's Gourdan stage.

3. Upper, harpoons with double row of barbs common, chisels with cylindrical shaft. Engraving deep and careless, degenerating



FIG. 67.—Bone engraving of reindeer, La Madeleine. [2]



FIG. 68.—Engraving of human fore-arm, La Madeleine. [3]

into mere ornament. End-scrapers (blades) and minute worked flakes sometimes called microliths. Subsequent developments of this culture are noticed on p. 126.

Cases 118, 119.

On the *top shelf* are pencil sketches showing by means of a red cross the position of the cave-dwellings of Le Moustier and Les Eyzies; also the cliff at Tayac and the castle of Les Eyzies, all in the Dordogne, France. Also reproductions of engravings on reindeer-horn chiefly from La Madeleine and nearly all in the collection.

On the *second shelf*, to the left, are engravings on schistose stone from Les Eyzies (fig. 69); a graceful head of an ibex on reindeer-horn from Laugerie Basse (fig. 70); and the unmistakable figure of a glutton (fig. 71) from one of the Dordogne caves, a further indication that the climate during the Madeleine period was of a sub-arctic character. At the back are reproductions of engravings in other collections, including the well-known figure of a mammoth on a piece of ivory, presented to the Natural History Museum at Paris by Mr. Christy. In the restoration of the mammoth, the tusks should curve inwards at the point.

On boards at the back of the *second and third shelves* are specimens from caves of the Madeleine period at Massat (Ariège) and Lourdes (Hautes Pyrénées). Belgium is represented

by series from Trou Magrite (late Aurignac), Trou de Chaleux (late Madeleine) and Trou du Sureau (late in the Reindeer period). Most of the palaeolithic caves are in the neighbourhood of Namur, and their relation to the French series is shown on p. 43.

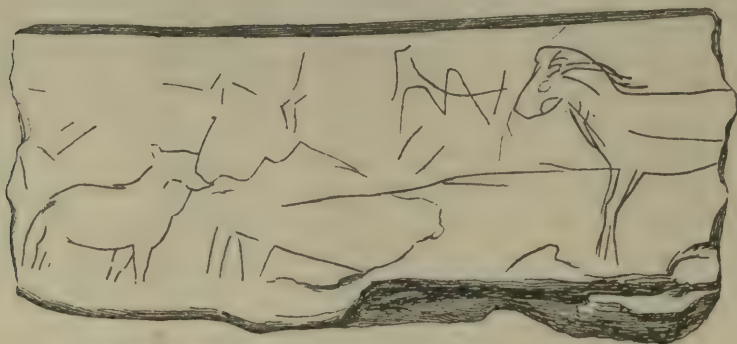


FIG. 69.—Engraving on schist, Les Eyzies. [3]

A few specimens from German caves are also shown, mainly of the Madeleine period, though at Hohlefels (Württemberg) these have subsequently been mixed with both earlier and later deposits (such as bear and rhinoceros, and pottery). At Schussenried



FIG. 70.—Head of ibex, Laugerie Basse. [3]

(Württemberg) the deposit is pure and the stratification as follows :—

Peat	7 feet.
Tufaceous deposit, yellowish white	..	4½	„
Bluish clay, Madeleine period	..	3¼	„
Glacial deposit below, depth unknown.			

The mosses found here, *Hypnum sarmentosum* and *H. aduncum* var. *groenlandicum*, indicate a very low temperature. A few flint-flakes on the right come from Thaingen (Switzerland), where the Kesslerloch cave is celebrated for sculpture and engraving. The Schweizersbild rock-shelter is also in the neighbourhood of Schaffhausen, but the earlier cave-period is mainly represented east of the Rhine at Taubach, near Weimar, where under a layer of tufa Moustier types have been recognised, with *Elephas antiquus* and *Rhinoceros merckii*.

The small series in this Case illustrating palaeolithic engraving and sculpture calls for a few words as to the development of this art. The use of bone for industrial purposes was very rare in the Moustier period, but became common in the succeeding cave period of Aurignac, the lozenge-shaped point with split base being then the typical bone implement. The earliest engravings seem to be those found in an upper level of this period at the Trilobite grotto, Arcy-sur-Cure (Yonne) : reindeer-bone engraved with a plant, and a schist pebble with a woolly rhinoceros and capridae.



FIG. 71.—Engraving of glutton, Dordogne.

These may be exceptional, as the best examples of engraving and sculpture undoubtedly belong to the Solutré and Madeleine periods ; and the late M. Piette pointed out that sculpture in the round preceded and gave rise to engraving on the flat. His ivory period (*éburnéen*) corresponds to the Aurignac, and is marked by sculptures in the round of archaic style represented by human figures, chiefly women, whereas a later and more developed style is seen in similar statuettes of animals. The material at this stage is generally mammoth ivory, but crystalline talc, steatite (soap-stone), bone and reindeer antler also occur. Human figures (always nude) were specially plentiful at Brassempouy (Landes), and figures of animals at Mas d'Azil (Ariège), the animals being almost exclusively of the Madeleine period. Sculptures in the round were finished with engraved lines to represent hair and other details, and the next step was the use of low relief, generally on reindeer antler, the hard portion of which was not thick enough for high relief. The outline was often engraved, and the ground then scraped away to throw it into relief, the work being finished with the flint graving-tool which is commonly found. The execu-

tion of low relief on thin plates of ivory inevitably led to pure engraving, examples of which are much more numerous than sculptures in the round, and, in contrast to the archaic style, often represent groups of animals and hunting scenes. Animals are generally shown in profile, and the human figure is rarely and imperfectly portrayed, the simian element being perhaps exaggerated by the artist. Engravings on stone predominated in the Gourdan cave (Haute Garonne), and a few specimens on schist and pebbles are exhibited from other sites. The animals represented are frequently of extinct species, and are sometimes drawn with remarkable accuracy, the hairy coat of the mammoth being apparent, and two breeds of horses being distinguishable. M. Salomon Reinach has pointed out that practically all the animals that served as models were useful to hunters and fishers, who encouraged them by sympathetic magic, whereas the undesirables, such as the lion, tiger, hyaena, jackal, wolf and serpent, are conspicuously ignored.

Though no reproductions of cave paintings and engravings can at present be exhibited, a note on these recently discovered masterpieces of prehistoric man must be added here in connection with sculpture and engraving. There are now at least twelve caves in France and north Spain where drawings of animals and men have been noticed on the walls, the most famous being those at Altamira (near Santander, Spain), and Combarelles, Font-de-Gaume, and La Mouthe, all in the Beune valley near Les Eyzies, Dordogne. Of these Combarelles contained wall engravings of over 100 animals, fourteen being of the mammoth; and Font-de-Gaume paintings in ochre and black of 77 subjects, comprising 49 aurochs, 4 reindeer, and 2 mammoth, as well as certain geometrical patterns. This phase of art has been closely studied by the Abbé Breuil, M. Cartailhac and others, the succession of the various styles being as follows:—

1st Stage (late Aurignac and early Solutré)—Engravings: broad and deep outlines, then silhouettes, very deeply cut with few details. Paintings: black lines, continuous or dotted, then monochrome outlines of animals, without modelling or many details.

2nd Stage—Engravings: still broad and deep, but more life-like, improving; the body scratched to show hair, etc., or enclosing colour-zones. Paintings: lines red or black, developing into tints spread over the body; then figures entirely painted in black, fully modelled, outlines sometimes engraved, and high-lights scraped.

3rd Stage (late Gourdan period)—Engravings: generally small, shallower, but still broad outlines, some figures admirable in detail, expression and proportion. Paintings: colour excessive, filling the whole space and spoiling the modelling, flat tints, showing a decline.

4th Stage—Engravings : simple graffiti, barely intelligible, detail exaggerated at expense of expression and general effect. Paintings : modelling recovered by use of polychrome, details in black on brown or red ; engraved outlines and details, modelling by scraping and washes.

5th Stage—Engravings and figure paintings cease ; but at Marsoulas (Haute Garonne) friezes, branches, dotted lines and spaces occur, also cross in circle, much like the painted pebbles of Mas d'Azil.

At the *bottom* of this Case are exhibited a few stone implements, bone harpoon-heads, etc., from countries still or till recently inhabited by primitive tribes, for comparison with the products of palaeolithic cave-men.

BRITISH BONE-CAVES.

THE scientific value of bone-caves was recognised at an early date in England. As long ago as 1816 the systematic exploration of a cave in the Devonian limestone at Oreston, near Plymouth, was undertaken by Mr. Whidbey, and the former existence of the rhinoceros in that region was fully established. This discovery followed close on the exploration of the Gailenreuth cave in Franconia, and preceded by about four years the publication of Dean Buckland's researches at Kirkdale, near Helmsley, in the North Riding of Yorkshire. The *Philosophical Transactions* of the Royal Society for 1822 contain an account of the cave, as well as the Dean's famous deductions from the evidence obtained, which pointed, as he thought, to the action of a universal deluge. The *Reliquiae Diluvianae*, published in 1824, owes its title to this preconception, and from the high scientific standing of its author, had an important influence on the study of early man. Besides several bone-caves in Germany and other parts of Europe, animal remains from many of which are exhibited in the natural history branch of the British Museum at South Kensington, the Dean described in more or less detail the discovery of bones of extinct animals at Kirby Moorside (near Kirkdale), at Hutton in the Mendip Hills, Somerset ; at Balleye and Dream Cave, Wirksworth, Derbyshire ; three sites at Plymouth ; and Crawley Rocks and Paviland (Goat's Hole), near Swansea. Some interesting drawings and diagrams are included in Dr. Buckland's work, and the discovery of the entire skeleton of a rhinoceros in the Dream lead mine may be mentioned as being of special interest.

The impetus thus given to the exploration of bone-caves resulted in the patient and successful investigation of Kent's Cavern, Torquay, by the Rev. J. McEnery between 1825 and 1841 ;

and the occurrence of flint implements in intimate association with fossil bones proved that man was contemporary with animals now extinct or not represented in this country. His researches were subsequently verified on the same site by Mr. Godwin Austen in 1840, and six years later by the Torquay Natural History Society; but the final examination of the cave extended over twelve years, and some of the results are shown in Cases **121, 122** (p. 66), others at the Natural History Museum.

Of the palaeolithic bone-caves not represented in this collection may be mentioned those of Banwell, Burrington, Sandford Hill, Bleadon and Hutton, all in the Mendip Hills; and the important series excavated by Professor Boyd Dawkins and published in his *Cave-Hunting*. Much valuable information as to the conditions of human life in Palaeolithic times has been derived from Wookey Hole, near Wells, Somerset, and various caves in the district of Gower, South Wales; while the Victoria Cave at Settle, W. R. Yorks, is specially interesting as having been a human dwelling-place at intervals down to Romano-British times, though there is little evidence that man was there contemporary with the hyaena of the lowest levels.

The late Dr. Falconer published accounts of discoveries in the neighbourhood of the famous Paviland Cave; and met with remains of the *Rhinoceros hemitoechus* as well as the woolly rhinoceros, the mammoth and the earlier *Elephas antiquus*; while the limestone on the opposite side of Caermarthen Bay contains several bone-caves, such as Coygan Cave, near Pendine, and the tunnel-cave called the Hoyle. King Arthur's Cave, near Whitchurch, Monmouthshire, overlooks the valley of the Wye, and is about 300 feet above the river; it was found to contain the gnawed remains of the cave-lion, Irish elk, mammoth, woolly rhinoceros, and reindeer, while flint-flakes, proving that it was also the resort of man, occurred in undisturbed strata. The sand and gravel may have been introduced at a very remote date by the river before the valley was cut to its present depth; and a similar explanation has been suggested for the presence of silt and water-worn pebbles in a fissure once inhabited at Cefn, near St. Asaph, North Wales, and also in Kent's Cavern, Torquay. Other bone-caves in the Vale of Clwyd are at Pont Newydd and Plas Heaton, and exploration has shown these to have been favourite resorts of the cave-hyaena, the teeth of which have left unmistakable traces on the bones of large carnivorous and other animals.

The more important of the palaeolithic cave-dwellings are marked with black pins on the map of England and Wales at the foot of the western spiral staircase, and it is clear that some of the sites were included in the area covered by glaciers during the great Ice Age. It is obvious, therefore, that man was in occupation either before or after that period, and the oldest deposits some-

times contain quartzite and flint implements of very rude workmanship, suggesting an antiquity as great as that of the human handiwork discovered in the drift-gravels.

Cases 121, 122.

Second Shelf: To the left, on the back of the case, are remains from a cave on the slope of Windmill Hill, near Brixham, Devon. This early site of prehistoric man is generally known as the **Brixham Cave**, and was excavated under the superintendence of a committee of the Geological Society, the necessary funds being supplied by the Royal Society. The cavern was formed by the action of water as it eroded the valley; and to the draining of the higher gravel is due the deposit of gravel at the base of the excavation, where water-worn stones but no fossils occur. During occasional droughts the cave seems to have been frequented by animals, their remains, however, being very scarce in that bed, while indications of man are comparatively numerous. As the valley became deeper, the cave became drier and was more resorted to by beasts of prey; but during a long period intermittent floods must have deposited the silt forming the cave-earth. This layer contained about 95 per cent. of the bones found in the cave, and an occasional flint implement shows that man was living in the neighbourhood. In the upper part of the cave-earth bones of the bear were very numerous, and the remains of cubs show that for some time this retreat was given over to this cave-haunting carnivore. Finally, as the floods ceased to reach the level of the cave, drippings from the roof deposited the layers of stalagmite which sealed up and preserved in an undisturbed condition the shingle and cave-earth of preceding eras. The cave, however, still continued to be the occasional resort of beasts of prey; and remains of the reindeer, together with those of the bear and rhinoceros, were found in the stalagmite floor. From that time detached blocks from the roof and the accumulation of *débris* rendered the cavern inaccessible to man.

The rest of this case contains a representative series of objects found at different levels in **Kent's Cavern**, or Kent's Hole, a cave in a limestone hill flanking a valley which about half a mile to the south terminates on the south coast of Devon, about a mile east of Torquay Harbour. It has been examined and excavated in part on more than one occasion since 1824, but a thorough exploration was carried out between 1868 and 1880 by a committee of the British Association. The excavations were mainly directed by the late Mr. Pengelly, of Torquay, who also acted as reporter; and it is mainly to his careful and systematic work that we owe our

knowledge of the early conditions of life in this the most important cave-dwelling in the country.

Though all the strata were not uniformly represented, the following is the descending order in which they occurred:—

1. BLOCKS OF LIMESTONE fallen from the roof, weighing from a few pounds to upwards of one hundred tons each, and in some parts cemented together by carbonate of lime.

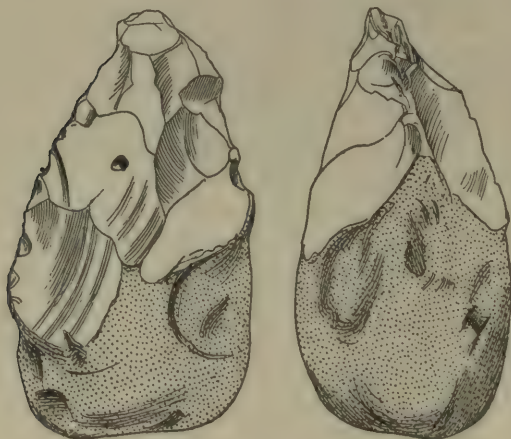


FIG. 72.—Flint implement, Kent's Cavern. [$\frac{1}{3}$]

2. A dark mud, known as the BLACK MOULD, from three to twelve inches thick, consisting largely of decayed leaves and other vegetable matter.

3. STALAGMITE FLOOR, commonly of GRANULAR texture, from one inch to upwards of five feet in thickness, frequently interspersed with limestone blocks.

4. Confined to an area of about one hundred square feet was the BLACK BAND, about four inches thick, mainly composed of small pieces of charred wood.

5. Light red clay, known as the CAVE-EARTH, containing on the average about 50 per cent. of limestone fragments, and various remains covered with thin stalagmite films. In some parts of the cave, this layer was not present, and elsewhere it was never more than four feet thick.

6. Wherever the bottom of the cave-earth was reached, there was found a STALAGMITE FLOOR of CRYSTALLINE texture, and sometimes as much as ten or twelve feet thick. Isolated crystalline masses also occurred in the cave-earth.

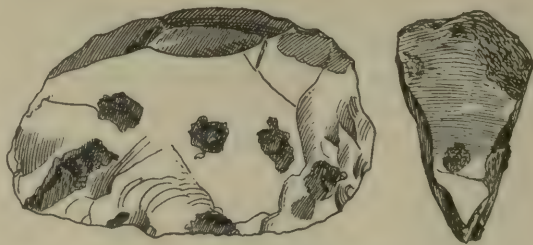


FIG. 73.—Flint side-scraper, Kent's Cavern. [$\frac{1}{2}$]

7. The lowest and oldest deposit in the cavern was composed of rounded pieces of quartz and dark red grit embedded in a sandy paste of the same colour. This is called the BRECCIA.

Second shelf: Implements of the Stone Age, ranging from the earliest handiwork found in this cavern on the left to the polished

stone implement of neolithic times on the right. Man was evidently living on or near this site during the formation of the dark-red breccia; and his implements, which occurred here and there in that stratum, were of rude and massive forms with

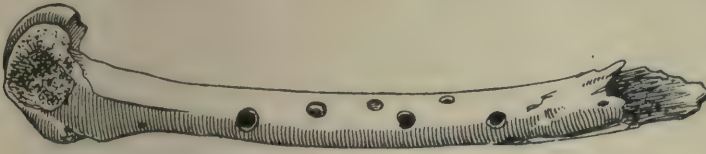


FIG. 74.—Perforated bone of hare, Kent's Cavern. [3]

unsymmetrical outlines. They differed from those of later date in being manufactured not from flakes, but from the flint nodule itself (fig. 72). Several specimens are exhibited in the original matrix, and their depth from the datum line or the top of a particular stratum noted on the labels.

The flint implements found in the cave-earth were carefully formed from flakes struck off for the purpose from blocks of stone, and show a more advanced stage of manufacture. They are ovate, lanceolate and tongue-shaped, and resemble specimens from the river-drift (Chelles and St. Acheul) as well as from the typical French sites of Le Moustier (fig. 73), Solutré, and La Madeleine. Besides stone implements, the cave-



FIG. 75.—Barbed harpoon-head, Kent's Cavern. [3]

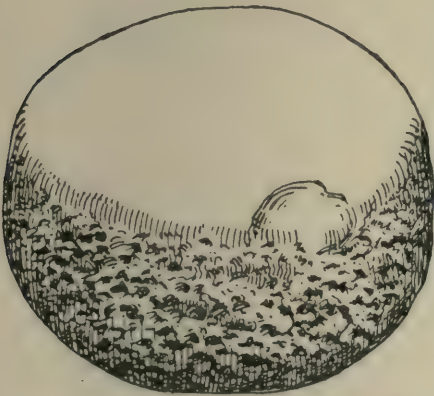


FIG. 76.—Hammer-stone, Kent's Cavern. [3]

earth also yielded a bone needle, a perforated bone of the hare (perhaps a whistle) (fig. 74), three bone or horn javelin-heads (of which one is shown) with barbs like a harpoon (fig. 75), hammer-stones (fig. 76), objects resembling whet-stones and a badger's tooth bored for use as a personal ornament. Reference to Cases **III-III9** will show certain analogies to palaeolithic finds in France.

by a crust of stalagmite that must have taken an immense time to form. The earliest remains here are of the Bronze period, such as the socketed celt and gouge here exhibited. These

Third shelf: The black mould or uppermost deposit is separated from the preceding

are succeeded by fragments of ornamented pottery dating from early British and Romano-British times, the contact with Rome being shown by a scrap of the red ware known as Samian. A knowledge of metal working is also proved by the discovery of a cake of smelted copper; while the spindle-whorls and bone combs, probably used by the ancient Britons in weaving, indicate an advance in domestic arts. More recent still are pieces of glazed earthenware that evidently date from mediaeval times. Animal remains from this stratum comprised bones of man, the dog, fox, badger, brown bear, Celtic short-horned ox, roe-deer, goat, pig, hare, rabbit, water-vole, seal and sheep, the last being the most plentiful. These all belong to species that still exist, and in some instances still occupy the same district.

Fourth shelf: Animal remains from the prehistoric levels of the cavern, showing that it was occupied from time to time by wild beasts that are now either extinct or mainly confined to extreme climates. In the granular stalagmite, black band and cave-earth extinct as well as existing species were found. The cave-hyaena was most prevalent, but the horse and rhinoceros were nearly as common. Remains of the Irish elk, wild bull, bison, red deer, cave-bear, brown and grizzly bears were not rare. Those of the cave-lion, wolf, fox and reindeer were less numerous; and those of the beaver, glutton and sabre-toothed tiger were very scarce. The bones had been rendered light and porous by the loss of the organic matter, and many of them had been gnawed and cracked by hyaenas.

In the lowest deposits (the crystalline stalagmite and the breccia), animal remains were less uniformly distributed, but in some spots formed about half of the deposit. These belonged exclusively to the bears, and there was nothing to indicate the presence of the hyaena. The bones from these layers were mineralised and brittle, some emitting a metallic sound when struck.

Third shelf: Special interest attaches to a small series from a site at **Oldbury Camp**, near Ightham, Kent, where there appears to have been a rock-shelter under a ledge of rock that has now been weathered away. Diagrams showing the geological conditions and probable position of the shelter are exhibited at the back of the Case, and the relics consist exclusively of flints (plate 3), some of which are practically identical with some from Le Moustier and the upper series found at La Micoque, Dordogne, the latter illustrating the transition from the St. Acheul to the Moustier periods. The six specimens represented in the upper part of plate 3 are flaked on both faces and are small amygdaloid implements, while the lower four are worked only on one face (the plain face of one is shown) and thus agree with the Moustier type. La Micoque, now open, but possibly once a rock-shelter, is on the terraced bank of a lateral valley near its junction with the Vézère, opposite Tayac, Dordogne,



PLATE 3.—FLINT IMPLEMENTS FROM PALAEOLOGIC SITE, OLDBURY
CAMP, KENT.
(Case 122, *see* p. 68)

and about 65 feet above the present stream ; while the prehistoric station at Oldbury is on the slope of a flat-topped hill, rising above the Lower Greensand and capped with hard siliceous grits of the Folkestone beds that cropped out at an angle, and no doubt afforded shelter to primitive man. The implements are unrolled, and were probably made on the spot, as a large number of small flakes were found in association.

Cases 123, 124.

Top, second and bottom shelves : Remains from the limestone caves of **Creswell Crags**, on the north-eastern border of Derbyshire, sections of the three principal sites being given with explanatory notes. Both sides of the ravine are much fissured, and the caves open some 15 feet above the lake formed by the damming of the stream.

The following comparative table shows the succession of layers where all occur, in descending order :—

<i>Church Hole.</i>	<i>Robin Hood's Cave.</i>
1. Stalagmitic breccia, with charcoal, worked flints, and bones.	1. Surface soil.
2. Reddish cave-earth, with charcoal fragments, layers of charcoal, flint implements, bones, and blocks of limestone.	2. Breccia with a few bones and flint implements.
3. Lighter cave-earth, with similar remains.	3. Cave-earth with bones and implements.
4. Mottled cave-earth, more sandy, with small angular fragments of friable limestone; quartzite and flint implements, and bones.	4. Mottled bed, light brownish matrix; bones and implements.
5. Light-reddish sandy earth; bone, but no implements.	5. Red sand, with bones and implements of quartzite.
6. White calcareous sand & rock.	

Both these caves were occupied, during the deposit of the lower cave-earth and red sand, by men who made and used rude implements of quartzite such as are seen on the *top shelf*. These seem to prove that the hunters of that period belonged to the same race as the dwellers in the open country who have left their implements of quartzite and flint (Case **105**) in the drift gravels of our rivers. In the breccia and upper cave-earth

of both caves are found implements of a higher order, made of flint brought from a distance and in workmanship like those of the French caves. The similarity to palaeolithic caves in France is also proved by the bone engraved with the head of a horse (fig. 77), as well as by implements of bone and antler, such as occur in continental caves of the Madeleine period.

The conditions in Mother Grundy's Parlour were somewhat different. Here the strata, in descending order, were:—

1. Surface soil.
2. Red sandy cave-earth with bones and other remains.
3. Red clay, with bones.
4. Ferruginous yellow and red sand, with bones.
5. White calcareous sand, with no remains.

In layer 2 were found quartzite implements such as occur in the red sand below the cave-earth elsewhere; but the red clay and ferruginous sand contained a peculiar fauna. The hippopotamus and leptorhine rhinoceros occurred with the hyaena and bison, but the horse, woolly rhinoceros, and mammoth were absent, and there were no traces of contemporary man. The hyaena was the principal occupant of Robin Hood's Cave during the deposition of the lower red sand and clay, but this occupation was interrupted by floods; and while the cave-earth was accumulating, man also made his appearance here and lived chiefly on the hare.



FIG. 78.—Quartzite implement, Creswell Crags. [$\frac{1}{3}$]

It may be added that the association of the hippopotamus and leptorhine rhinoceros, both animals of southern habit, points to an early pleistocene date, especially as these animals are often found in company with the *Elephas antiquus*. The hippopotamus is a survival from the pliocene fauna, and though common in the drift gravels, is, like the leptorhine rhinoceros, less frequently found in caves; although rarely associated with the mammoth, both have been found with arctic mammals such as the reindeer.

Top shelf: Specimens of chipped quartzite evidently fashioned by man from pebbles (fig. 78); and better worked flint flakes, which show an advance in manufacture. Among the latter may be distinguished forms that correspond closely to specimens of the



FIG. 77.—Horse's head engraved on bone, Creswell Crags.

early Solutré period in Cases **III**, **II2**: the flat leaf or lozenge-shaped lance-head (fig. 79, no. 1), the scrapers with one or both ends rounded (nos. 2 and 3), and a small oval implement with serrated edge (no. 4).

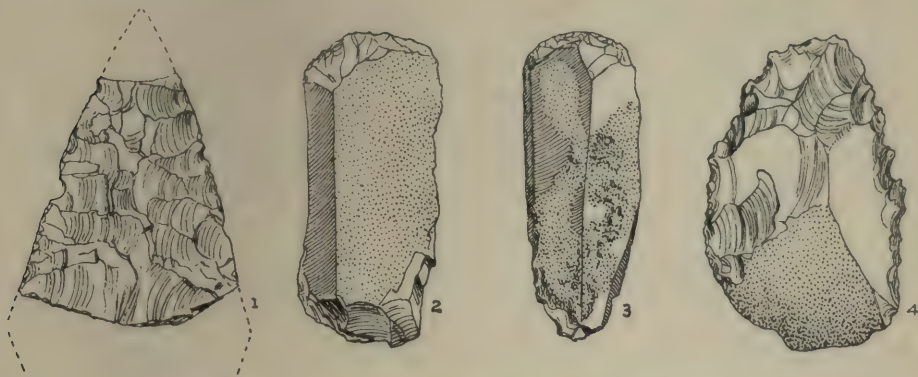


FIG. 79.—Flint implements, Creswell Crag. [3]

Second shelf: Diagrams showing sections and ground-plans of the three principal caves, with some details of the human and other remains discovered. Specimens of the breccia, containing implements and bones of extinct animals. Two ironstone implements (fig. 80) of oval shape should be noticed, as also bones of the woolly rhinoceros gnawed by the cave-hyaena (fig. 81).

At the back are five photographic views of the Creswell Crag; and on boards are specimens of flint, horn and bone, including a fine leaf-shaped implement, a needle, gouge and borer of bone, and the only engraved bone of the palaeolithic period found in England, with an outline sketch of a horse's head (fig. 77). These remains may be contemporary with the Madeleine finds in France.

The industry of Creswell Crag is hard to classify, but a few outstanding specimens may be mentioned as possibly belonging to different periods of occupation; side-scraper made of a broad flake, graving points, boring tool with neck (like some from Trou de Chaleux, Case **II8**, and Les Eyzies, Case **II2**), long flake with waist, and large flakes dressed on the bulbar faces (as in Kent's



FIG. 80.—Ironstone implement, Creswell Crag. [3]

Cavern and Ffynnon Beuno cave, St. Asaph), much in the Solutré style, and one fragment (fig. 79) appears to be part of a laurel-leaf blade, the characteristic form of the early Solutré period. The other specimens illustrated are single and double planes (end-scrapers), and an implement flaked only on one face. The bone needle and bone plate with serrated edges are highly suggestive of Montastruc, Bruniquel (figs. 50, 63).

Bottom shelf: Animal remains similar to those from Kent's Cavern in the preceding Case, but special attention may be drawn to the tip of an hippopotamus-tooth and of a mammoth-tusk, those animals being characteristic of different latitudes, as are also the woolly rhinoceros and cave-lion, the hyaena and reindeer, etc. An extensive collection of fossil bones from this and other palaeolithic caves is on exhibition at the Natural History Museum.

Third shelf: A small series of remains discovered in caves and tunnels of the limestone at **Torbryan**, near Denbury, Devon. Most of the excavation was due to the unaided efforts of Mr. Widger, but the published accounts are inadequate, and the



FIG. 81.—Rhinoceros bone gnawed by hyaena, Creswell Crags. [$\frac{1}{2}$]

diagram in this Case must be regarded merely as indicating the succession of the beds with their principal contents, the more precise measurements of their depths being in some cases contradictory. The upper beds appear to have been generally as follows, in descending order:—

1. Angular stones.
2. Black mould.
3. Stalagmite floor.
4. Diluvium, or angular and rolled stones.
5. Stalagmite floor.
6. Cave-earth (red-clay) = reindeer stratum.

Under these, in one part, were clays and sand, with remains of an older crystalline floor such as was also observed in a broken condition at Kent's Cavern; elsewhere, the lower beds were a dark fetid earth with quartz pebbles and with remains of hyaena; a bone-bed with the usual cave-fauna found in this country; and a

deposit containing remains of the cave-bear. Some of the animal bones are preserved at South Kensington, and the objects of human handiwork here exhibited are of a miscellaneous description, with insufficient details of their discovery; but the difference in colour of the flint flakes is due to the fact that some are stained by the charcoal bed at the surface of a pit near the entrance, the rest occurring at a deeper level in the same pit. Along with the blackened series was found the interesting little object of bone (fig. 82), which is pierced as though intended to hang by a string to the person. The sandstone spindle-whorl may belong to the Neolithic or a later period, but there can be no doubt as to the polished stone axe-head here exhibited. The piece of basalt may also have served as an implement, and should be compared with an axe-head of the same material on the top shelf of Case 127, found near Bridlington, on the coast of Yorkshire.

Future discoveries will no doubt bring the culture of our cave-men into closer relation with that of the Continent, but already there are indications in Scotland of some connection with the latest palaeolithic and subsequent cave-life in the Pyrenees. The evolution of the harpoon-head has been already noticed (p. 59), but there is a still later stage marked by flat and perforated harpoons, painted pebbles, small round scrapers and blades of flint like those of a pen-knife, which belong at least to the early part of the hiatus. Double harpoons, one

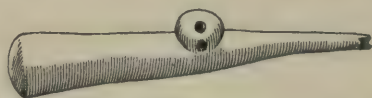


FIG. 82.—Pierced bone pendant, Torbryan Cave. [3]

(at least) perforated, have been found in MacArthur's Cave facing the bay of Oban; and there is geological evidence to show that this opening in the cliff face, now 100 yards from the beach and 30 feet above high-water mark, was inhabited by man at a time when the sea could deposit shingle inside the cave. Other harpoon-heads of deer-horn, single and double, have been found in the rock-shelter of Druimvargie and in shell-mounds in Oronsay; while one was found in the Victoria Cave at Settle, W. R. Yorks, and a perforated specimen has been picked up on the shore at Whitburn, co. Durham. Another curious discovery in Scotland seems also to find a parallel in the Mas d'Azil period. In three of several brochs (defensive towers of masonry) on the Caithness coast at Keiss occurred quartz pebbles painted with spots and lines in a brownish-black pigment, but apart from further evidence it would be rash to assign these to the Mas d'Azil period, as the majority of objects discovered in the brochs of Scotland point to the early Iron age.

[A fine series of remains from the cave-earth of Kent's Cavern is exhibited in the Department of Geology and Palaeontology, Natural History Museum, comprising stone implements of

various forms manufactured from the nodule, as well as worked flint flakes, some of which show considerable skill. There are also specimens of human handiwork from certain of the Welsh caves, dating from palaeolithic times, as well as a small series (including neolithic implements) from Torbryan Cave. Attention may further be directed to an entire antler of a reindeer superficially embedded in the stalagmite floor of Brixham Cave (p. 65); a block of breccia from Trou des Forges, Bruniquel, enclosing a human skull; and the fossil remains of extinct animals from the pleistocene beds and various caves, both in England and abroad. Casts of the skull of the sabre-toothed tiger are exhibited; and the extraordinary size of the extinct fauna is illustrated by the skull of a cave-lion placed beside one of the modern species, and the complete skeleton of a cave-bear. In the centre of the gallery are skeletons of the mammoth and Irish elk.]

LATER STONE AGE.

AT the beginning of the Neolithic Age, great changes had come over the face of Europe. The dry cold of the later Cave period had given place to a more temperate and rather moist climate; while of the animals with which the cave-dwellers had been associated, some, like the mammoth, had become extinct; others like the reindeer, had wandered to distant regions. Great Britain, formerly a part of the Continent, had again become an island, and Africa and Europe had been divided by the Mediterranean Sea. Changes almost as remarkable had modified the old manner of human life. Man had now learned to tame animals and train them to his domestic use; he cultivated cereals for food, and textile plants to provide material for woven garments; he used the bow as his ordinary weapon; he had developed the art of making pottery; and he often constructed dwellings raised on piles in lakes and rivers to secure himself against danger of attack. The burial of the dead now became a matter of ceremonial importance; and from the chambered sepulchral mounds (long barrows) erected over the bodies of chiefs, as well as from other megalithic monuments, we may perhaps derive evidence of the birth and increase of primitive religious beliefs.

In the provision made by man for his defence and for the needs of everyday life, there had also been a great development. Implements and weapons were now commonly hafted and made in a greater variety of forms; while by the adoption of grinding and polishing, it became possible to employ other hard stones in addition to flint or quartzite. The use of polished stone has been sometimes regarded as the special characteristic of the newer Stone Age; but a large and important class of the more delicate implements and weapons, such as knives, scrapers and arrow-heads, were but rarely ground or polished, while even axes of exceptionally fine workmanship were sometimes finished by chipping alone. And down to the very end of the period, thousands of implements must have been manufactured, the grinding of which would have been simple waste of time. We cannot always with certainty assign particular uses to individual prehistoric implements; but we may assume that some of the rough axe-like tools were employed, as presumably in prehistoric Egypt and in North America, for breaking clods or other simple agricultural operations. Tools of this kind would be rudely

chipped into shape and perhaps ground a little at the edge, the rest being still left in the rough. It is unlikely that all the roughly-chipped axes of the neolithic period found in Great Britain and elsewhere should be imperfect implements still awaiting the final process of grinding and polishing. This may be in part the case with the unground implements of Grime's Graves and Cissbury (Cases **125**, **126**), which probably represent the uncompleted products of the factories existing on those sites. But numbers of the unground neoliths which are picked up in our fields are doubtless completed tools; and some of the rudest flint implements ever found in Britain are those discovered in 1901 in the foundations of Stonehenge, where they had evidently been used for dressing the surfaces of the monoliths: yet Stonehenge is commonly assigned to the dawn of the Bronze Age. Mere roughness of form unsupported by any other evidence is therefore no guarantee of the antiquity of an implement. A few words must be said in this place as to the hafting of axes in neolithic times. The collection contains specimens with the original hafts complete from Ehenside Tarn, Cumberland (Case **131**), Solway Moss (Table-case **B**), and the lake-dwellings of Switzerland (Case **S**). The method adopted in all these examples was not that commonly preferred by savage tribes, viz., the lashing of the blade to the short limb of a pick-shaped handle in the manner illustrated by several examples shown in a frame on the wall adjoining Case **152**. The procedure was to cut a transverse hole fitting the butt of the stone blade in a straight haft, the upper end of which was left thick enough for the purpose. The objection to this method is that the force of repeated blows is liable to split the wood, though, as will be seen from the Swiss examples, the lake-dwellers had invented a device which obviated this disadvantage. They fixed the blade in a socket of deer-horn (fig. 148), the elasticity of which deadened the effect of the blows upon the wood.

Although for the sake of convenience we use the terms Stone Age, Bronze Age and Iron Age, there is of course no sharp line of demarcation between the actual periods which they describe. Stone implements continued to be largely used after the introduction of metal, and are constantly found in the Round Barrows in conjunction with bronze; while the Bronze and Iron Ages overlap in the same way. Indeed, for certain exceptional purposes, stone and flint have not been discarded even in our own day; gun-flints, grindstones and burnishers are cases in point. Their survival is not always due to utilitarian reasons, but sometimes to motives of superstition or religion, the methods and appliances of ancient days having acquired in course of time a sanctity which keeps them in ceremonial use long after they have been discarded for ordinary purposes. Thus the Egyptians continued to use stone knives for embalming the

dead centuries after the introduction of metals into the valley of the Nile; and the priests of ancient Mexico tore out the hearts of their victims with blades of stone or obsidian, though for secular purposes metal had long been in common use. In the same way men who were well acquainted with bronze and iron deposited flint flakes and stone implements in the graves of their dead in perpetuation of an ancient tradition. The custom was known among the Merovingian Franks, and survived in folklore, though with an altered significance, to a much later period. Shakespeare alludes to it as an unchristian usage fit only for the interment of a suicide:

"For charitable prayers,
Shards, flints, and pebbles should be thrown on her."
(*Hamlet*, Act v., sc. 1.)

As amulets to avert the evil eye and protect the wearer from disease, neolithic implements, especially small axes and arrow-heads, have been in request from ancient times down to our day in almost every country, civilised or savage, in which stone has been long superseded by metal. Stone axes and flint arrow-heads are often thought to be thunderbolts which had fallen from heaven, and are known under various names, of which that of 'elf-shot' is the most familiar. Not very many years ago application was made to the director of the Liverpool Public Museums for permission to apply a stone axe-head to the body of a sick child, while the existence of a similar superstition in other countries is exemplified by the specimens exhibited in Table-case **L**, which are amulets worn in different parts of Europe at various times. If further illustration is needed, it may be found in the Gold Ornament Room, where there is shown an Etruscan gold necklace having a mounted flint arrow-head as a central pendant. In Cases **150**, **151** are two small polished axes from Egypt evidently used in the same way, while the ground haematite axe-heads from the Nile-Congo watershed in Case **148** are held by the present natives of the country to be effectual remedies against disease. The frequent representation of stone axes in conjunction with other ceremonial objects on the curious bronzes from Benin exhibited in the African section of the Ethnographical gallery affords an additional proof of the same widespread superstition.

Although there are but few objects in the collection which can be referred to barrows (burial mounds, tumuli) of the neolithic period, a few words must be added here on the subject of these monuments. The custom of raising a mound over the dead, so commonly adopted in the old and new worlds, was practised in Western Europe from neolithic times through the age of bronze into the period when iron was extensively used.

In Britain the barrows which appear to belong to the neolithic period, before any metal, excepting perhaps gold, was in use, are known from their shape as LONG BARROWS to distinguish them from the Round Barrows, which from their not infrequently containing articles of bronze, are assigned to the period after the introduction of that metal. Long Barrows generally point east and west, the eastern end being rather broader and higher than the other. The body has usually been placed in a rudely made chamber of stone, sometimes with a rounded opening in the wall at one end. These barrows are more plentiful in the south-western counties of England than in the north, and inhumation is the rule, at least for the primary burials, though some peculiar long barrows in Yorkshire contained cremated bodies grouped in the furnaces where they were burnt. When the body is buried unburnt, the bones are often disjointed, as if the skeleton had been placed in the mound after the flesh had decayed. In connection with this peculiarity it may be noted that in Tahiti the interment of the bones of the dead only took place after the complete decay of the flesh, and in other parts of the savage world a long interval is allowed to elapse between death and burial. Something of the same kind may have occurred in Spain during the Bronze Age, as in that country two skeletons have been found in a single urn which would not have contained the bodies of two persons buried shortly after death. It is rare to find any articles associated with the body in a neolithic barrow, and for this reason there is but little in the collection to represent this type of interment (p. 129). The physical character of the long barrow skeletons differs from those of the round barrows of the Bronze Age; the former are invariably long-headed, while the latter are generally round-headed, though long skulls sometimes occur. By way of explanation it may be added that skulls are classified by measurement, the length being represented by 100, and the breadth regarded as a percentage of the length. Most skulls vary in breadth between 70 and 85, and within these limits three classes have been established. Those between 70 and 75 are called *dolichocephalic* (long-headed); those between 75 and 80 *mesaticephalic* (medium-headed); and those between 80 and 85 *brachycephalic* (short-headed).

It must be remembered that when we speak of the Neolithic Age, we do not imply a civilisation uniform in all parts of the world. There are differences in the style of neolithic objects even within the limits of Europe, nor can we assume that customs and beliefs were everywhere the same. The men who brought the new arts into Europe probably belonged to various tribes and issued from centres in which the habits of life were dissimilar. As a single instance of such divergence, it may be mentioned that in Finistère, Marne, Aisne and the neighbour-

hood of Paris incinerations are met with in dolmens and other stone tombs of the neolithic period, whereas in Scandinavia and generally in Britain the body in such cases is buried unburnt.

The beginning of the Neolithic Age is so remote and obscure that attempts to assign it a precise date are apt to mislead. All that we can say with certainty is that physical conditions were then similar to those of modern times, and that the animals associated with man belonged to existing species. We may, however, be sure that some parts of the world developed the new arts far sooner than others. The relative advance towards civilisation of various countries has always been extremely uneven, favoured districts, such as the great river-valleys, outstripping those which are less advantageously situated. For the same reason the Stone Age came to an end far earlier in some parts of the world than others. While in ancient Egypt copper was already in use before 5000 B.C., stone tools were still employed in Great Britain and Northern Europe some three thousand years later. The conversion of the world from the use of stone to that of metal has been proceeding in more remote lands ever since; but in most cases it will never be known when the change actually took place. Even in our own time there are outlying districts where metal is a novelty, though modern commerce is rapidly reducing their number.

The word 'prehistoric' has therefore not everywhere the same meaning. In America, it includes the whole period from the remotest times until the voyage of Columbus, and implements of the neolithic type were made by Indian tribes long after the time of the first European settlements. Even the more advanced civilisations of Mexico, Central America and Peru, though they flourished for centuries, can show no records which, like those of Babylon, Egypt, and China, carry their history back to a remote antiquity. History, in short, begins later in America than in Europe, Asia, and Africa, and the duration of the prehistoric period is therefore proportionately greater.

With the exception of Africa, parts of Asia, and the civilised countries of the American continent, the savage world made known to Europe by the voyages of discovery undertaken from the close of the Middle Ages to the present time has been almost always in the neolithic stage of culture. Even the inhabitants of Mexico and Peru, though in possession of copper and bronze instruments, did not disdain the use of stone and obsidian; and fine examples of their work in these materials may be seen in the American Room. The value of Ethnography to Prehistoric Archaeology is therefore very great; the two branches of science are in fact complementary to each other, and Ethnography can frequently throw a most useful light upon archaeological problems. For instance, the similarity of the winter houses of

Arctic peoples, with their covering of earth, to the chambered barrows suggested the reasonable explanation that these barrows were really survivals of actual houses. It is a common practice among primitive peoples to bury a man in his own house, or, by a development of this idea, in a tomb resembling a house; and it is therefore natural to infer that the chambered barrows are tombs of this description. In the same way the existing pile-villages of New Guinea and other Asiatic islands provide a most life-like illustration of the vanished lake-dwellings of Switzerland (figs. 83, 84). Again, from existing ethnographical specimens made of perishable materials, such as wood, skin, basketwork, or matting, we may form some idea of the costumes and household utensils of primitive man in Europe which have almost entirely disappeared. For although differences of temperature involve differences of equipment, the diversities of climate in savage countries are so wide that most of the conditions of life in



FIG. 83.—Village built on piles, New Guinea. (*After photo by J. W. Lindt*)

neolithic Europe must be reproduced in one place or another. And as like needs produce like means of satisfaction, the contrivances with which men in similar stages of progress overcome natural obstacles are in all times very much the same. In all probability, therefore, the resemblance between the perishable productions of the modern savage and those of prehistoric man, which are now lost, was in proportion to that existing between implements of stone and bone which have remained. This similarity between the recent stone industry of savage peoples and that of ancient Europe will be at once obvious to any one who examines the collections in the American Room and the Ethnographical Gallery. Attention may be especially directed to the splendid polished axes and chipped knives from Mexico and Honduras, and to the series of chipped arrow-heads from North America in the Table-cases of the room first mentioned; and to the following objects, among others, in the Ethnographical Gallery: the Eskimo implements of stone and bone; the arrows fitted with stone heads from

historic North America; the stone clubs, adzes and pounders from the north-west coast of America; the stone rings used by the Bushmen of South Africa to weight their digging-sticks; the stone axes from Fiji; the jade axes from New Caledonia; the stone implements from the Solomon Group; the remarkable basalt ceremonial adzes from Mangaia in the Hervey Group; the mounted adzes of Hawaii and Tonga; the adze blades of less finished character from Samoa; the splendid jade axes and clubs



FIG. 84.—View showing structure of pile-dwelling. (After photo by J. W. Lindt)

from New Zealand; the rude stone implements from the neighbouring Chatham Islands; the large ceremonial axes from the d'Entrecasteaux Islands near New Guinea; and the stone-headed clubs from the same country. The visitor will also notice many examples of rude pottery, some of which, especially those from prehistoric North America, will recall the work of early man in Britain. Compared with our own neolithic antiquities, nearly all the objects which he will thus pass in review are comparatively

modern ; and their existence will serve to remind him over how long a time and over what an enormous area the stone age extended. For even as late as the middle of the eighteenth century one-third of the habitable globe had not advanced beyond it.

The transition between the Palaeolithic and Neolithic Ages is still very obscure. We suddenly find a different culture and different kinds of implements, which indicate a different way of life ; but we cannot say exactly how or where the old order gave place to the new. There are some who hold that the cave-dwellers are divided by a great lapse of time from their neolithic successors ; that there was an absolute break of continuity, during which the populous centres of the older Stone Age were deserted ; and that the new culture was introduced by the invasion of another race, bringing the elements of a new civilisation in its train. How, it is asked, can the occupation of Western Europe have been continuous when in the caves the remains of the two periods are constantly separated by layers of stalagmite which must have taken an immense time to form ? There are others who maintain that since certain physical peculiarities of the cave-races persisted into the Neolithic Age, the breach of continuity can have been only local. It is impossible in this place to enter into the various arguments which have been brought forward in support of these conflicting theories ; their wide divergence serves to show how elementary our knowledge really is of the early prehistoric periods. It is, perhaps, possible to establish a compromise between the two views by supposing that while for unknown reasons old settlements were abandoned, and whole communities followed the retreating reindeer to the north, a part at least of the ancient population still maintained itself in Western Europe until it finally amalgamated with the bearers of the new culture, who entered their country from the East. It seems probable that caves were not the only habitations of late palaeolithic man ; the remains found at Solutré (Saône-et-Loire) show that there were also settlements in the open air ; and it has been conjectured that the valleys and plains of France and Belgium were occupied by hunters whose way of life may have been somewhat different from those of the dwellers in caves. The implements and weapons which they have left behind are in some ways distinct from those of the troglodytes ; and it has been suggested that they may have continued the traditions of the implement-makers of the Drift period, devoting their principal attention to the flaking of flint rather than to the carving of bone. On this theory the two industries would have existed side by side, the carving on ivory and bone dying out owing to the disappearance of the reindeer, the flint industry remaining to develop new forms in neolithic times. Such a hypothesis at least attempts to explain

the disappearance of the wonderful skill of the cave-men in delineating animals, an art which for sureness of touch and general truth to nature has seldom been surpassed. The day may still be distant on which we shall be able to substitute for hypothesis a theory confirmed by indisputable facts; meanwhile the search now being carried on for *mesolithic* (Gr. μέσος, middle, and λίθος, stone) or transitional implements, will doubtless shed further light upon the question, though it appears more likely to lead to satisfactory results on the Continent than in England, where convincing evidence in favour of a mesolithic period has hitherto not been forthcoming. It is rather by discoveries made at places like the cavern of Mas d'Azil (Ariège), to the north of the Pyrenees, that our knowledge will be ultimately increased. At present it is commonly supposed that among the earliest examples of neolithic workmanship are those discovered in the shell-mounds of Scandinavia.

Case 120.

Recent geological investigations into the climatic and geographical changes of the southern Baltic have thrown some light on the succession and character of the prehistoric periods; and the main divisions have been named after characteristic fossil shells:—

- (i) *Yoldia* period: arctic climate with Dryas (mountain avens) flora.
- (ii) *Ancylus* period: (a) sub-arctic, with Scots pine forests, wych-elm and hazel.
(b) Boreal, dry and warm; immigration of the oak.
- (iii) *Littorina* or *Tapes* period: (a) Atlantic, mild; immigration of spruce and beech. Maglemose (Mullerup, Zealand) culture, followed by kitchen-middens and subsequently by passage-graves (p. 131).
(b) Sub-boreal, dry and warm; limit for trees (such as the hazel) raised. Bronze Age.
- (iv) *Limnaea* period: Sub-atlantic, humid. Iron Age and historical times.

The first appearance of man in this area was at the end of the *Ancylus* period; and certain axes of reindeer-antler may have preceded the Maglemose culture, which is marked by the use of harpoons with a single row of teeth (as fig. 49), resembling some from Scottish caves (p. 73). The succeeding Midden period is marked by a variety of stone implements, the presence of the domesticated dog and by the rudiments of pottery; this is thought to correspond to the Campigny period of the Franco-Belgian area (p. 96).

A small series from the kitchen-middens (*Kjökkenmöddinger*) of the Danish coast, which are great heaps of shells, principally those of the oyster, accumulated on the sites of early settlements. Like the modern inhabitants of Tierra del Fuego, the people who occupied these sites lived chiefly upon shell fish, and the refuse of their meals in course of time formed large mounds, sometimes hundreds of yards in length, in which numerous flint implements, bones and fragments of pottery are found embedded. The implements are of a rude description, and unground, but the size of some of the flakes argues a considerable skill on the part of those who produced them. The typical form (fig. 85) is peculiar in having its cutting edge (at the broader end) produced by the removal of a single transverse flake, not by a number of blows in the direction of its longer axis; this type is known by the French name *tranchet*.



FIG. 85.—Flint implement, kitchen-midden, Denmark. [$\frac{1}{3}$]

The bones of mammals found in the shell-heaps are chiefly those of the stag, roe-deer, and wild boar; the sheep, horse, and reindeer being unrepresented. The long bones have been broken to extract the marrow, so that it is evident that the people of the kitchen-middens lived in part at least on the products of the chase. They appear to have had no knowledge of agriculture, and their only domestic animal was the dog. Shell-heaps of a somewhat similar description occur in the British Isles, *e.g.*, on the Moray Firth, Loch Spynie, and at Oban in Scotland; on the Wash; at Hastings, Ventnor, Tenby, and in Devonshire and Cornwall in England; and on the shores of Cork Harbour, Ireland; but these remains are not all of the same early date.

In the *upper part* of the Case are specimens of flint flakes and implements from Eriksholm and the great shell-mounds at Meilgaard in North-east Jutland, with a few implements or hafts of deer-horn; in the *lower part* is a section from the Meilgaard mound, which was examined and correctly interpreted by Worsaae in 1850. Among the shells can be seen a few bones and flint implements.

Cases 121, 122.

On the *top shelf* is a small series from kitchen-middens at Hastings, Sussex, explored by Mr. Lewis Abbott, who distinguishes three groups: ordinary neolithic forms in comparatively small numbers; a large series of worked flakes; and highly specialized diminutive forms generally called pygmies or microliths (p. 126). The last may have been used as fish-hooks, but the larger flakes

exhibit a great variety of forms and fall into no obvious types. Nor does the fauna help towards a definite dating of this occupation by man, though several species of molluscs, fish, birds and animals were recognised. Fragments of pottery were fairly plentiful, but mostly small, belonging to large-bottomed domestic utensils of coarse well-baked black or dark red ware. Several bore traces of fire, and portions of old hearths were noticed among the refuse. The area concerned is Castle Hill, formed of Ashdown sand-beds about 170 ft. above the sea, the midden material being most abundant in fissures and on ledges under a layer of blown sand.

Cases 125, 126.

The contents of these two Cases illustrate the methods adopted by neolithic man for extracting flint suitable for the manufacture of his implements and weapons. The best flint is found in seams or layers occurring at irregular intervals in the chalk, and the finest quality is often at a considerable distance from the surface. The early flint-miners excavated regular shafts in favourable localities, penetrating to depths varying from ten to forty feet. Numerous shafts were usually sunk in close proximity to each other, the material excavated from fresh pits being thrown into old ones; galleries following the seams of flint were then tunnelled from the bottom of each shaft, most of the pits being connected with each other in this way. The implements used in excavating were picks made from the antlers of the red deer, punches and chisels of the same material, and flint tools manufactured on the spot. Some of the galleries being nearly thirty feet in length, artificial means of lighting must have been necessary, and the cup-like objects cut from blocks of chalk exhibited in the Cases are in all probability the primitive lamps used by the miners. These are not the only examples of carving in chalk, other pieces of this material having been discovered which have evidently been modelled. A peculiarity about the implements found in and about the flint mines is that hardly any of them are ground or polished; they are simply chipped into form, often in the rudest manner; and the excavations conducted at the most important mines in England, Grime's Graves near Weeting, Norfolk, and Cissbury Camp, near Worthing, Sussex, have only yielded two or three ground axes out of many hundreds of implements. The animal remains found in the shafts are those of species belonging to the present geological period. The roughness of the tools and the primitive nature of many forms, which recall types of the cave period, suggest that the Cissbury implements may belong to the earlier part of the neolithic period, but it must be remembered that the form of an implement is not of itself a criterion of age (p. 109). Very

primitive implements are manufactured to this day in various parts of the savage world, as for instance in Australia (examples in Cases 118, 119, and Table-case 174 in the Ethnographical



FIG. 86.—Miner's pick of deer-antler, Grime's Graves. L. 22 in.

Gallery). Flint mines, like those at Cissbury and Grime's Graves, have been found on the Continent, the best known being at Spiennes, near Mons, in Belgium (Cases 134, 135).

The upper part of these Cases is devoted to objects from Grime's Graves, Weeting, Norfolk, excavated by Canon Greenwell in 1868.

Top shelf: A number of miners' picks made from antlers of the red deer, one (fig. 86) still retaining the impression of a miner's thumb in the chalky clay which adheres to the surface; and several blocks of chalk from a shaft, showing marks made by such picks and other tools when the pit was originally excavated.

Second shelf: Two of the supposed lamps of chalk, with a fragment of a third; a ground axe-head of basaltic stone of a type usually found in Yorkshire—the only ground implement found in the mine; a bone implement, perhaps a flaking-tool; a bone awl and a small deer-horn pick; water-rolled pebbles, with marks of abrasion, used as hammers and for flaking; and a large number of chipped blocks, flakes, and implements (figs. 87 and



FIG. 87.—Flint flake, Grime's Graves. [$\frac{1}{3}$]

88) from various depths in the shaft, the finer specimens being mounted on a board at the back of the Case. At the ends of the shelf are sections and diagrams of the pits at Grime's Graves and

Cissbury, showing by means of different tints the various materials used for filling in, as well as the undisturbed strata on either side, with the bands of flint at different levels.

Third shelf: Collection from the flint-mines at Cissbury Camp, near Worthing, Sussex, obtained as the result of excavations made



FIG. 88.—Flint chopper, Grime's Graves. [$\frac{1}{4}$]

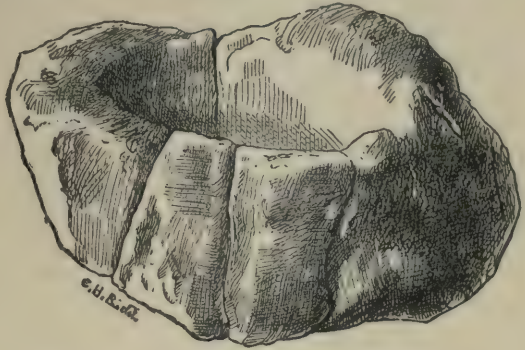


FIG. 89.—Chalk lamp, Cissbury. [$\frac{1}{2}$]

by Lt.-Col. Lane-Fox (afterwards General Pitt-Rivers) in 1867, by Mr. E. H. Willett in 1874, and by an Exploration Committee of the Anthropological Institute of Great Britain and Ireland in 1875, Col. Lane-Fox acting as reporter.

Among the more remarkable objects are the two *scapulae*, or shoulder-blades of an ox (*Bos longifrons*), mounted on boards at the ends of the shelf and considered to have been used as shovels; a chalk lamp similar to those from Grime's Graves (fig. 89); several



FIG. 90.—Flint implement, Cissbury. [$\frac{1}{4}$]

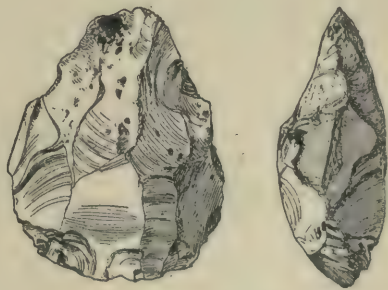


FIG. 91.—Flint implement, Cissbury. [$\frac{1}{3}$]

implements made from the antlers of red deer including one large pick, and several wedges and punches supposed to have been used for detaching blocks of chalk; and a large number of flint implements, only one of which, an imperfect axe, shows any

traces of grinding The leading type is a long oval with cutting edge all round, and convex faces (fig. 90), but one or two have a striking resemblance to the palaeolithic hand-axe (*coup-de-poing*), and one is illustrated (fig. 91). They are evidently contemporary with the rest, with the same white surface, due to superficial decay and impregnation of chalk from the surrounding soil.

Bottom of the Case: A number of flint implements, ground axes, knives, scrapers, flakes, fragments of coarse pottery, &c., found 1871-78 on the floors of circular hut-sites at Grovehurst, Milton-next-Sittingbourne, Kent. The large number of flakes discovered suggests that this place was a regular factory of flint implements in neolithic times. On one of the boards may be noticed a particularly fine flint knife resembling specimens from

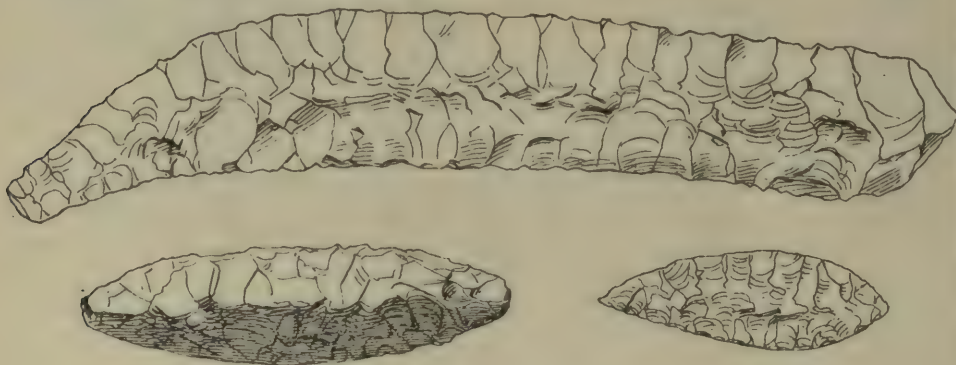


FIG. 92.—Flint knife and points, Grovehurst. [$\frac{1}{2}$]

the Thames at Chelsea (Case **M**) and Greenwich (Museum of Practical Geology), probably used as a sickle; and two delicately chipped lance-heads of the same material (fig. 92).

Cases 127, 128.

Neolithic implements from **England** and **Wales** grouped according to counties, selected specimens being shown in Table-case **M** on the floor of this room. The surfaces are either ground and polished or left rough after chipping, and for the most part come under the heading of 'celts,' a term denoting an axe-head more or less of chisel form, either in stone or bronze, without any reference to the Keltic race. The good and unchanged condition of specimens from the Thames will be noticed, in contrast to flint exposed to the weather on a chalky soil, like some exhibited from Dorset and Kent. In Yorkshire ground celts of basalt are common, the surface being often decayed and rough. Long 'picks' from the Thames represent a large series found in the

river and its neighbourhood, and may belong to the Campigny period (p. 95); they are generally supposed to have been used in mining the chalk, but may also have served in hollowing out canoes from the trunks of trees. Other noteworthy specimens are the perforated mace and axe-hammers, part of a very large flint celt with squared sides (p. 90) from East Anglia, and a 'transverse' arrow-head of a Continental type (as fig. 127) from Speeton, E.R. Yorks. On *boards at the back* are smaller chipped implements, end-scrapers and arrow-heads of various forms from the Yorkshire Wolds, Derbyshire and Cornwall; and on the right side is a board of flint 'fabricators' (fig. 93) usually regarded as tools for sharpening



FIG. 93.—Flint
'fabricator,'
Suffolk. [3]



FIG. 94.—Flint and pyrites for striking
fire, Yorks. [3]

a blunted edge by pressing off small flakes, but recent research in Scandinavia suggests that they were used with lumps of iron-pyrites (fig. 94) for producing fire (as with flint and steel), the pyrites having in most cases perished, but sometimes occurring in barrows (Case 25 below).

Cases 129, 130.

Neolithic implements from **Ireland**, mostly ground and polished, but in many cases slightly unsymmetrical: the majority are made of fine sandstone, greenstone (diabase) and chert (hornstone), and come from the north-eastern counties. Besides the celts, of which a large number have been found, there are exhibited hammer-stones made of pebbles with signs of use at the end or side; and pebbles hollowed in the centre of one or both faces and perhaps used as anvils in the manufacture of flint implements, as seems to have been the case at Whitepark Bay, Antrim (Case 132). On *boards at the back* is a fine series of flint arrow and lance-heads (plate 4) and scrapers of various forms, chiefly from co. Antrim.

Case 131.

Neolithic objects found in draining a small lake called **Ehenside** (or Gibb) **Tarn**, near St. Bees, Cumberland. They were discovered by Mr. R. D. Darbishire and others in the vegetable layers which had formed in the bed of the tarn, and are of special interest from the fact that so many of them are of wood, and have been preserved by the moisture from decay. Stone axes with their hafts complete, such as the one here exhibited, are of extreme rarity (see also cast in Table-case **B**).

Upper part of Case : A curious paddle-shaped object of oak with three prongs, a small paddle, the pierced oak haft of an axe, and a mallet, with casts of other wooden objects discovered at Ehenside, but most of which are not in the Museum—viz., a

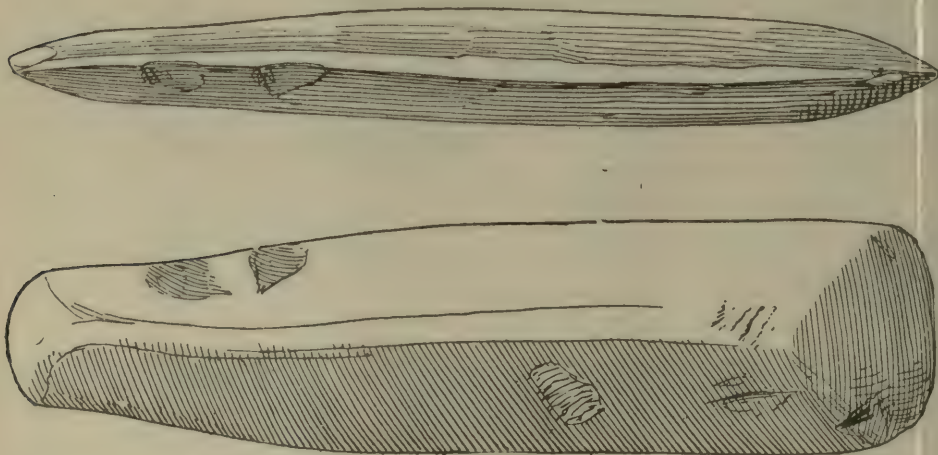


FIG. 95.—Stone axe-head, Ehenside Tarn. [3]

remarkable curved implement or weapon shaped like a Cupid's bow, a paddle-shaped club, and an object with a flat rectangular head, which may be a club or an unfinished axe-haft, the hole intended to receive the stone head not having been bored: the broken original of this object is preserved in water on the bracket below. On the shelf are six axe-heads of felstone or other pale green stone, three completely ground, some of remarkable size and weight (fig. 95). On the bracket to the left, below the shelf, are a ground stone axe-head, and (in the glass bottle) the original beechwood haft with which it was found. On the bracket to the right, in a glass bottle, is the original club or unfinished axe-haft of which a cast is exhibited above.

Bottom of the Case : A number of fragments of coarse pottery vessels, possibly of the neolithic period; a piece of a shale vessel

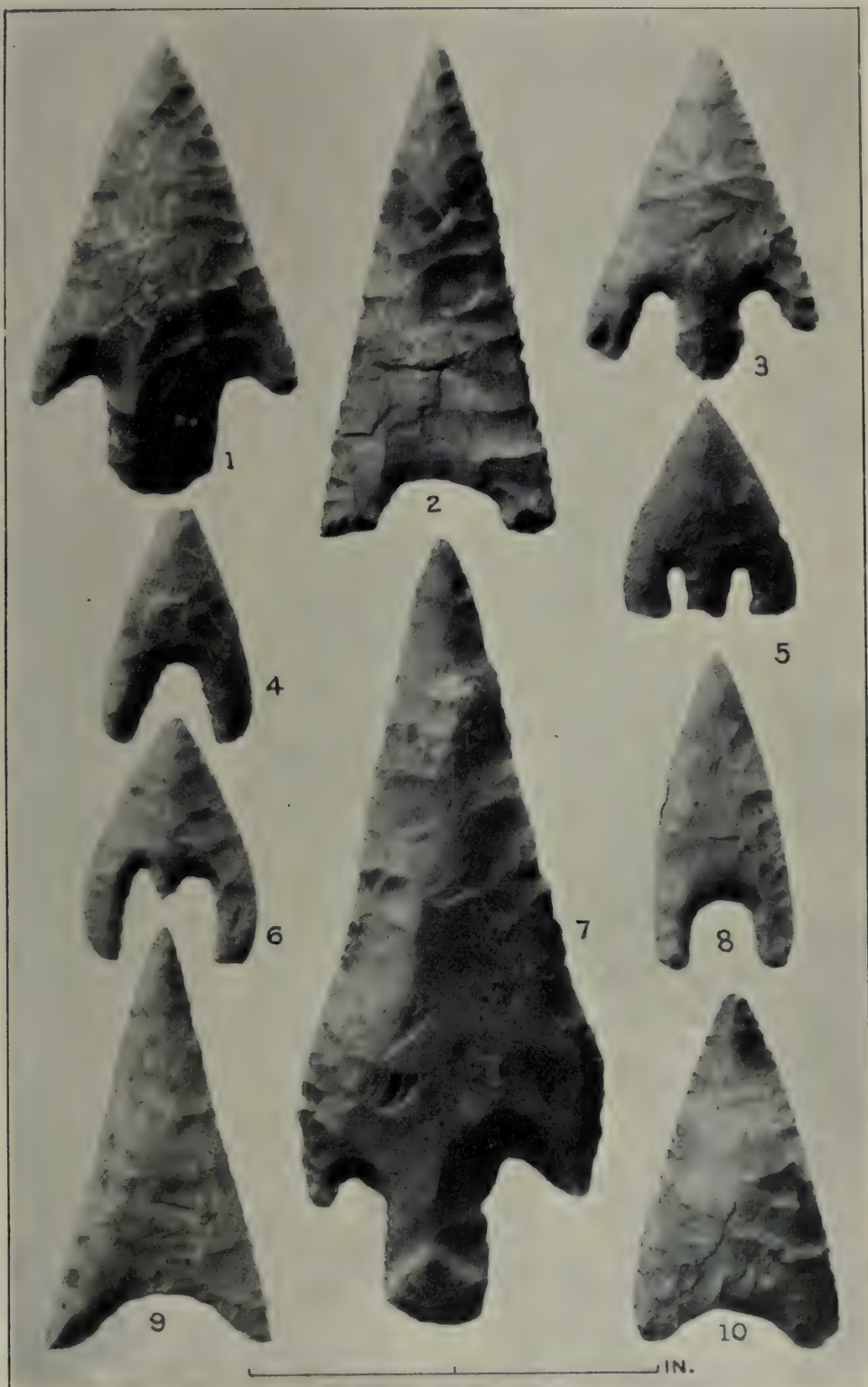


PLATE 4.—NEOLITHIC LANCE AND ARROW-HEADS, IRELAND.
(Cases 129, 130, *see* pp. 89, 122)

turned on the lathe, dating from Roman times, and a block of stone used for grinding stone axe-heads. Other grindstones from the same site are exhibited in the end of Table-case **C** in the room below.

Cases 132, 133.

On the *top shelf* are celts both polished and unpolished from **Scotland**, mainly from the Shetlands, where many reach unusual proportions: some on the left are made of green porphyry. There may also be mentioned a thick celt of limestone now decalcified, with a pointed butt recalling those of a certain period in Scandinavia (p. 100). A grooved stone axe-hammer from Caithness resembles a specimen from Sicily (Case **140**), and in its method of hafting a series of mallets that seem to be connected with early mining, and are found in the south of France, Finistère and Normandy, as well as in the copper district near Cordova and elsewhere in Spain; Ireland, Denmark, Italy, Russia, Austria, Sinai, North and Central America, have also yielded specimens of this type.

Below Table-case **K**, north end, are mining tools from the gold mines of Erythrea, Abyssinia, and a cast of a large grooved mallet from France; at the south end, a typical series of flint and stone from Aberdeenshire, including a hollowed pebble, celts and scrapers.

The *second shelf* contains a series from sand-hills on the shore of **Whitepark Bay**, five miles from the Giant's Causeway, co. Antrim. The site is one of many discovered on the north coast of Ireland that are now covered with sand but were evidently inhabited in neolithic times. The original surface at Whitepark Bay is specially interesting and contains worked flints, whereas in many other stations the remains are found only in the sand, which has accumulated sometimes to a thickness of 20 or 30 feet above the prehistoric stratum. This is a black band about 3 inches deep, which, however, in some of the hut-circles attains a depth of 36 inches. Examples of earlier worked flints with weathered surfaces are also found on these sites, and show signs of having been re-chipped by neolithic man, but it is doubtful whether any human work on them goes back to palaeolithic times. This series was excavated and presented by Mr. W. J. Knowles who considers the hollowed pebbles to have been used as anvils in the manufacture of flint implements, and there is a gradation from a few pick-marks to a smooth saucer-shaped depression, sometimes on both faces of the stone, recalling several found in French palaeolithic caves (Cases **112**, **116-7** and fig. 43), where they are supposed to have been used for pounding pigment. There are besides

hammer-stones made of flint, quartzite and other hard pebbles, bruised at the end; hollow-scrapers of flint (fig. 96) and ochreous stones that have an appearance of greater antiquity, but it is possible that the staining is due in such cases to contact with seaweed containing iodine. It is noteworthy that no polished implements have been found in association, but there is at present no means of fixing the relative date of this series in the neolithic period.

On *boards at the back* are flint flakes and scrapers, and fragments of rude pottery vessels showing ornament made by impressing cords in the wet clay; also bones and teeth of animals belonging to the present geological period.

On a *shelf below* are worked flints including cores, from a raised beach at **Larne**, co. Antrim, collected and presented by Miss Layard. They are of different forms and colours, and



FIG. 96.—Hollow scraper of flint, Ireland.

have been discussed from time to time, but no clue to their relative date or dates has been found. In a section of 15 ft. the upper layers produced, in the first 3 ft., flints with unchanged or a bluish surface, with iron-staining in blotches and along the ridges; below these the iron-staining ceased, and the flints were thickly coated with a white porcellanous patina. In the lower levels, especially at 9 ft. from the surface, the flints were much rolled and had evidently been exposed on a shore before the sinking took place, which preceded the formation of a beach 20 ft. above present high-water mark. The brown staining is due to contact with seaweed lying on the shore.

Below are more celts from Ireland including a large unpolished specimen from Cushendall, co. Antrim; and at the bottom a series from the sand-hills near Stranraer, Wigtownshire, including arrow-heads and other points, round-scrapers and saws of flints, more hollowed pebbles (as from Ireland), polished celts and pottery fragments.

Cases 134, 135.

On the *top slope* is a series of polished stone celts, generally of small size, collected in **Brittany** where megalithic remains such as dolmens, chambered barrows, circles and menhirs (standing stones) are abundant. These are regarded in France as marking the close of the neolithic period (p. 96), in spite of the absence of copper

with the burials, that metal usually heralding the advent of bronze; and the celts, which are often made of rare materials, are found associated in the graves with callaïs beads and pendants (fig. 158), flint implements and cores, vessels and spindle-whorls of pottery, and rarely ornaments of gold. A series of such remains from

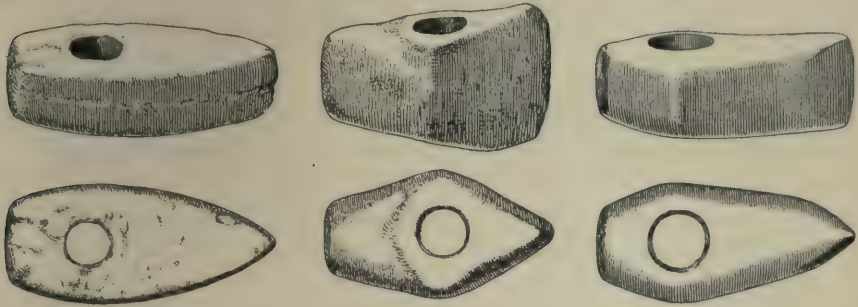


FIG. 97.—Perforated axe-hammers, Govt. Kieff, Russia. [†]

French dolmens is exhibited in Table-case **E**, on the floor of this room. The mode of burial was not uniform at this period, cremation being introduced here before the beginning of the Bronze Age (p. 79). There can be no doubt that the dolmens and chambered barrows were ossuaries opened from time to time for the deposit of human remains, so that the burials do not all necessarily belong to the same stage of culture. Two or more layers of deposits have been noticed in these megalithic chambers, not only in France, and it is clear in certain English cases that the Bronze Age and even later people made use of the tombs of their predecessors.

On the *second and third shelves* are polished stone celts and axe-hammers from **Germany**, especially Halberstadt, Merseburg and Magdeburg in Saxony; these are comparatively small, and generally have flattened faces. Larger specimens in flint come from Holland, and Scandinavian influence can be seen in specimens from Holstein, the island of Rügen, Mecklenburg, Dresden, Moravia and S. Russia, the sides being chipped square, as fig. 102.

Perforated stone axe-hammers, some apparently modelled on bronze specimens, come from Russia, Hungary, and Austria, and may be compared with examples from the lake-dwellings of Switzerland (Case **S**).

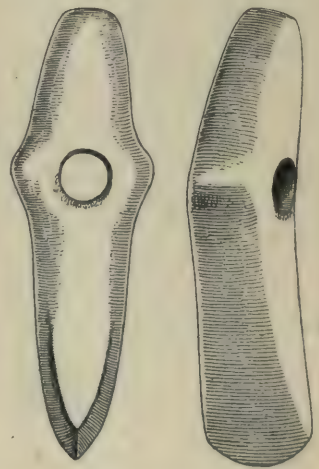


FIG. 98.—Perforated axe-hammer, Doeverden, Holland. [†]

On *boards at the back* are several casts of typical specimens from Holland: large axe-hammers like some from N. England (fig. 144), and pottery of the zoned beaker type corresponding to our 'drinking-cups' (p. 132). From Finland: curious axes with shaft-holes and butts in the form of animals' heads, also with projections on either side of the middle like the trunnions of a cannon. From Germany: grooved axe-hammers from the lower Elbe district, showing Scandinavian influence, and four remarkable flat axes found together near Mainz. These last are made of a variety of jadeite, and with others of similar material used to be considered as proof that there was connection between Central Asia and Europe, and perhaps a great migration westward. But it has since been shown that implements of chloromelanite, jadeite, and nephrite are only found near places where the material naturally occurs, in Europe the Alpine region. Thence it spread to Germany, Belgium, France, Italy and Switzerland. A specimen of the same character, said to have been found at Canterbury, is in Table-case **M**, with another from Brierlow, Derbyshire; and others are known from Masham, Yorks, and Drummond Hill, Perthshire.

On the *slope below* is a series of flints from **Spiennes**, Belgium, where flint was mined in neolithic times as at Cissbury and Grime's Graves in England. Deer-horn picks used by the miners are also shown, and the flint was not only mined but manufactured on the spot, and widely distributed in Belgium from this centre, which had been important even in palaeolithic times. The Spiennes flint is naturally greyish-brown, but exposure has induced a white patination that plainly shows iron-stains, due no doubt to contact with agricultural implements on the surface. Probably older than the galleries of Spiennes are the open-cast workings at Obourg in Hainault (where a miner's skeleton was found), but there the excavating was done exclusively with deer-horn picks, not with flint tools in addition as at Spiennes. Mines for the extraction of flint from the chalk have also been discovered in France, at Champignolles (Oise), and it may be noted that the dimensions of individual pits are considerably greater in Britain and perhaps indicate less skilful working.

Case 136.

Neolithic implements from **France** grouped according to localities, and resembling in several cases contemporary specimens in England. This is specially noticeable in the series from the Seine and Paris, also from the Departments of Somme, Aube, Yonne, and Oise; and in the arrow-heads, on a *board at the back*. The Morbihan type (Cases **134**, **135**) is represented also in the Department Manche, while Auvergne has produced specimens

that bear a remarkable resemblance to the diminutive celts of Asia Minor (Case 139). At the *bottom of this Case* are roughly flaked flints from the site of a factory at Girolles, Loiret; and similar finds are exhibited in Wall-cases 63, 64, from the Morel collection (p. 139).

Case 137.

The main exhibit in this Case consists of heavy cores or nuclei (known locally as *livres de beurre*, from a supposed resemblance to pounds of butter) and long flakes from **Grand-Pressigny** (Indre-et-Loire), a core from which a blade has been struck being illustrated (fig. 99). The chalk of Touraine contains bands of honey-coloured cherty flint in exceptionally large nodules, and in prehistoric times a large industry was carried on in the neighbourhood of Pressigny, the flint being widely distributed either in a raw or half-finished condition. More than half the French departments contain specimens found in the soil, and a certain quantity was sent beyond the frontier into Belgium and Switzerland. The chief finished product was the long blade, for use as a knife or dagger (not as a spear-head), and this had the edges trimmed on the core before being struck off. Saws and long planes were also produced, and there seems to have been a regular division of labour, implements at a certain stage of manufacture being found together. Polished implements are comparatively rare at Pressigny, but the industry may have lasted through the neolithic period, the finished implements not being left *in situ* as were the cores and inferior flakes.



FIG. 99.—Flint core, Grand-Pressigny. [$\frac{1}{8}$]

On *boards* are arranged series of flints representing different stages of neolithic culture in Europe, as arranged by Dr. Alfred Rutot. After the Tardenois stage (represented by pygmy flints more or less in the Madeleine style), there is thought to be a change for the worse, in the shape of rude stone implements found largely at Le Flénu, near Mons in Belgium, and recalling the eoliths of that country. This was followed by the Campigny culture (p. 96), illustrated by examples from Elouges, near Mons; and this in its turn gave way to the higher forms best represented at Robenhausen in Switzerland, the climax of the neolithic period. Typical blades and polished celts are shown from Spiennes and St. Symphorien in Hainault.

The famous **Campigny** find was made in pit-dwellings on a hill near Blangy-sur-Bresle, Seine-inférieure, and consisted largely of flint implements and flakes, with a few bones of the ox, horse and

Type of Localities	1.—Early Neolithic. Campigny Period.			2.—Mid Neolithic. Chassey and Robenhausen.			3.—Late Neolithic. Carnac Period.		
	Le Campigny (Seine-inf.) Vaudeurs (Yonne) Othe district (Aube and Yonne) Champignolles (Oise) Commercy (Meurthe-et-Moselle) Nermont Grotto (Yonne) Ghlin (Belgium): Bologoe (Russia) Danish Kitchen-middens			Chassey (Saône-et-Loire) Camp Barbet } Oise Camp de Catency } Fontenay St. Père } Seine-et-Oise Les Mauduits } Robenhausen (Switzerland)			Megalithic remains as in Morbihan and Champagne, Scandinavia, Spain, Portugal, Corsica and Cornwall Auvernier (Switzerland) Tourinne (Belgium) Collorgues (Gard)		
Flint Working	Flint-working, Madeleine style Tranchets of Danish middens Rough, indeterminate implements but used without being polished Celts chipped, Celts slightly polished, rare			Raw material from local and other sources. Increased number of im- plements. Daggers, fixed polishing stones. Saws, gouges: conical per- foration of stone. Macs. Polished stones. Deer-horn hafting for celts. Building and navigation. Nets, sinks, fish-hooks and floats. Bas- kets, spinning-whorls, spinning and weaving of flax. Bows and arrows, slings and lances. Grinding of corn. Trees and crops cultivated. Bread, butter, cheese, fermented drinks: domesticated animals. Pottery with handles and ornament and of in- creased size. Spoons of baked clay.			Artistic forms of celts, large and small Perforated axe-heads Callais, jet, quartz, steatite ornaments, and polishing		
	Flint mines (Champignolles) Coarse pottery (Le Campigny), showing the art in rudimentary state Dog domesticated			Caverns and grottoes Pit-dwellings, wattle-and-daub Lake-dwellings on piles			Menhirs, avenues, stone-circles, oblong enclosures, dolmens and chambered barrows Engraving and sculpture Surgery and trepanning Improvement of earlier industrial products Superior pottery		
Other Industries	Caverns and grottoes Rock-shelters, and hearths hollowed out of the earth			Caverns and grottoes Pit-dwellings, wattle-and-daub Lake-dwellings on piles			Improved habitations Pit and lake-dwellings on piles. Italian terremare.		
	No burials yet found with relics of this period: probably not the practice			Inhumation in caverns and grottoes, or in the earth. Objects deposited in graves, but none before this period			Inhumation in dolmens, chambered barrows, and cists, with votive axes, entire or purposely damaged. Flints chipped over body at time of burial. Imitation celts buried. Amulets of human skull. Ossuaries, care of the dead, burial of food, etc.		
Habitations									
Burials									

deer. The surface soil of a typical pit contained polished flint, and below was a filling of yellow sandy loam about four feet deep, with the typical Campigny industry. At the bottom was a deposit of cinders and charcoal with similar relics, and the pit was bowl-shaped, about fifteen feet across the mouth. One of the typical flint forms is a pick six inches long, much like a number of specimens from the Thames (Case **M**); another is the *tranchet*, or kitchen-midden type of axe-head (p. 84); other types are the scraper, plane and graving-tool, 'parrot-beak' blades, points and cores, some being similar to their palaeolithic predecessors. There were also fragments of pottery decorated with linear patterns. Dr. Capitan has thus summarised the conclusions to be drawn from this discovery:—

'The number of hearths showed that the plateau was selected by a number of people who appreciated social life. The practice of polishing stone implements was here later than the occupation and filling-in of the pit-dwellings, when pottery had already been introduced. Several palaeolithic types survived, and Campigny followed on what may be called a mesolithic period, the transition from the old to the new Stone Age. Grinding-stones imply the preparation of grain, and possibly agriculture, and the fauna and flora resembled the present. The same culture has been recognised in many parts of France, in England, Belgium, Denmark, S. Sweden, Poland, Russia and Palestine.'

Case 138.

A mixed collection of neolithic and later dates (two objects, a fish-hook and spear-head, being made of bronze), found in the caves of **Gibraltar**. It consists of a number of fragments of coarse pottery vessels, many with impressed geometrical ornament, ground stone axes, bone awls and pins, fragments of shell armlets, and flint flakes. On one of the boards are mounted some of the bones of animals discovered in the caves which seem to have been largely used as ossuaries. With the exception of the skull already described (p. 9), the human bones were not of special interest, and were found in great disorder.

On the *bottom of the Case* are flint flakes, fragments of shell armlets, &c., from a cave at Alhama, Granada, Spain; and a pottery vessel of comparatively fine workmanship with projections on the sides, found at Cueva Lobrega, Old Castile. Other neolithic objects from south-eastern Spain will be found in Cases **38**, **39** and Table-case **K** in the room below, together with antiquities of the Bronze and early Iron Ages (Siret collection) from the same locality, from which it was considered undesirable to separate them (p. 116).

Cases 139, 140.

On the *top slope* are neolithic remains from **Portugal**, and plaster casts of celts, some being unusually large with an almost circular section. Engraved slate pendants, with designs probably of ceremonial significance, are exhibited in Table-case **K**. Portugal is one of the coastal countries in which dolmens (as fig. 159) are common, and were evidently used for burials in the neolithic period. Polished arrow-heads are also found in Portugal as in Ireland (p. 122), but seem to be confined to these two countries.

The *middle shelves* contain neolithic implements from the **Mediterranean** countries, generally of diminutive size and made of stones other than flint. In Greece and Asia Minor the palaeolithic period seems to be unrepresented, and in later times native hard stones were utilised, such as diorite, diabase, trachyte,



FIG. 100.—Diminutive stone celt, Ephesus. [$\frac{1}{2}$]



FIG. 101.—Stone celt, Alhama, Granada. [$\frac{1}{4}$]

basalt, haematite, and nephrite of poor quality, while there was also a considerable obsidian industry, the principal centre for that material (volcanic glass) in Europe being the island of Melos. The stone series has been divided by Chr. Blinkenberg into solid celts with pointed or blunt butts, thin celts, thick and thin chisels (narrower than the celts), and axe-hammers with shaft-hole. Both thick and thin celts have been found together in a hoard near Megalopolis (Arcadia), and were evidently contemporary, but one cannot be considered an advance on the other, and it is probable that the thin variety originated in the use of stones that naturally split into plates like slate. There is evidence that the use of obsidian lasted well into the Bronze Age of this area, but the celts are not found in graves or habitations of that period, and were probably given up as soon as metal was introduced, copper being worked in Cyprus as early as 2500 B.C.

Of special interest are the mace-head from Hierapolis (Phrygia),

a flint saw from the Piraeus (Athens), a jadeite specimen from Thebes (Greece) resembling a small paper-knife, and a hollowed pebble from Cyprus, like fig. 43. Perforated axe-hammers are not uncommon in this region, and the Asia Minor type of celt is also represented in Crete. A flat pear-shaped implement from Babylon is chipped all over both faces, but thickest at the narrow end, where a patch of crust remains.

On *boards at the back* are arrow-heads, blades, and scrapers from Italy, and rougher specimens from the island of Elba; also small polished celts from Italy, Sicily, and Greece of the usual forms. A number of obsidian specimens come from the Greek Islands and mainland.

At the *bottom* of this Case are polished celts from Spain, some rivalling the largest from Portugal, and many with almost circular section and of similar type. The series is mostly from Alhama (between Granada and Malaga in the south of Spain), and includes a few small specimens resembling those from Asia Minor. Other neolithic remains from the country are exhibited in Table-case **K** below.

Cases 141-146.

The neolithic industry of **Scandinavia**, when it had passed the primitive stage represented by the kitchen-middens, assumed a marked individuality and developed a great variety of forms. The later products of Denmark are among the finest examples of flint-chipping in existence, and are only surpassed by the marvellous knives of pre-dynastic Egypt (Cases **150, 151**). There are some traces in southern Scandinavia of a flint industry before the kitchen-midden stage, which is held to coincide with the Campigny period. No great change in culture took place till the latter part of the neolithic period, which part may be divided as follows:—

1. Flint celts with pointed oval section, some polished (fig. 102, no. 1). Form of graves unknown, perhaps simply holes in the earth.

2. Flint axes with squared sides, convex faces and thin butt, some polished (no. 2). Dolmens of oldest type, without passage of approach.

3. Flint axes with squared sides and broad butt, almost square section (no. 3): flaked daggers (fig. 125) and arrow-heads. Passage graves (cf. figs. 154, 155), all but the cap-stone covered with a mound of earth. Amber frequently found.

4. Flint celts as before; ribbed, polished and perforated axe-hammers (fig. 128), polished gouges (fig. 104) and developed daggers (plate 5, no. 2). Stone cists, at first with cap-stones not covered with earth; later, entirely covered, and sometimes below original surface. Amber rarely found. Also (in Jutland) graves below

surface without stone cists, but outlined with boulders, for single burials: men buried with perforated axe-hammers or flint celts, women with amber necklaces of beads and plates.

It has been suggested by Prof. Montelius that in the fourth stage of culture amber, which had long been exported to the south

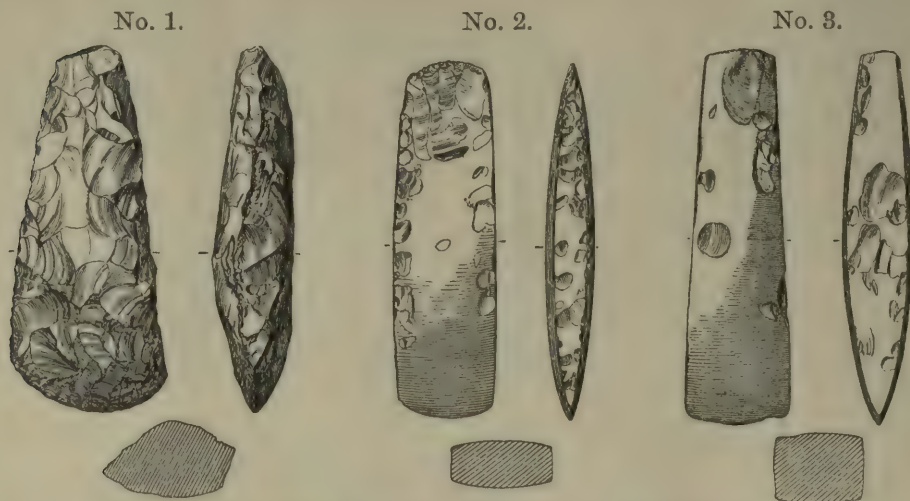


FIG. 102.—Evolution of Scandinavian celts, with sections. [$\frac{1}{4}$]

of Europe, began to be valued by the natives, who refrained from burying it; and the peculiar Jutland burials may be accounted for by a scarcity of stone slabs in that region.

In the Scandinavian area, and generally in Europe (p. 78), the dead were placed in these tombs unburnt, in varying numbers



FIG. 103.—Neolithic vase, Denmark. [$\frac{1}{3}$]

and attitudes; and in some cases the flesh was apparently allowed to decay before the bones were interred. Signs of fire have been noticed in the stone chambers and sometimes on the bones, but this must be explained by periodical opening of the tomb and disturbance of the remains, not by the practice of cremation. No agreement has been reached as to the absolute chronology of the neolithic period in Scandinavia, but bronze seems to have been introduced later than in Britain, and a date

midway between the two extremes suggested would be 1500 B.C. for the opening of the Bronze Age in the southern area, the northern part of the peninsula remaining in the Arctic Stone Age till historic times. This last is represented by slate lance and arrow-heads, celts often with bevelled cutting-edge, and pottery

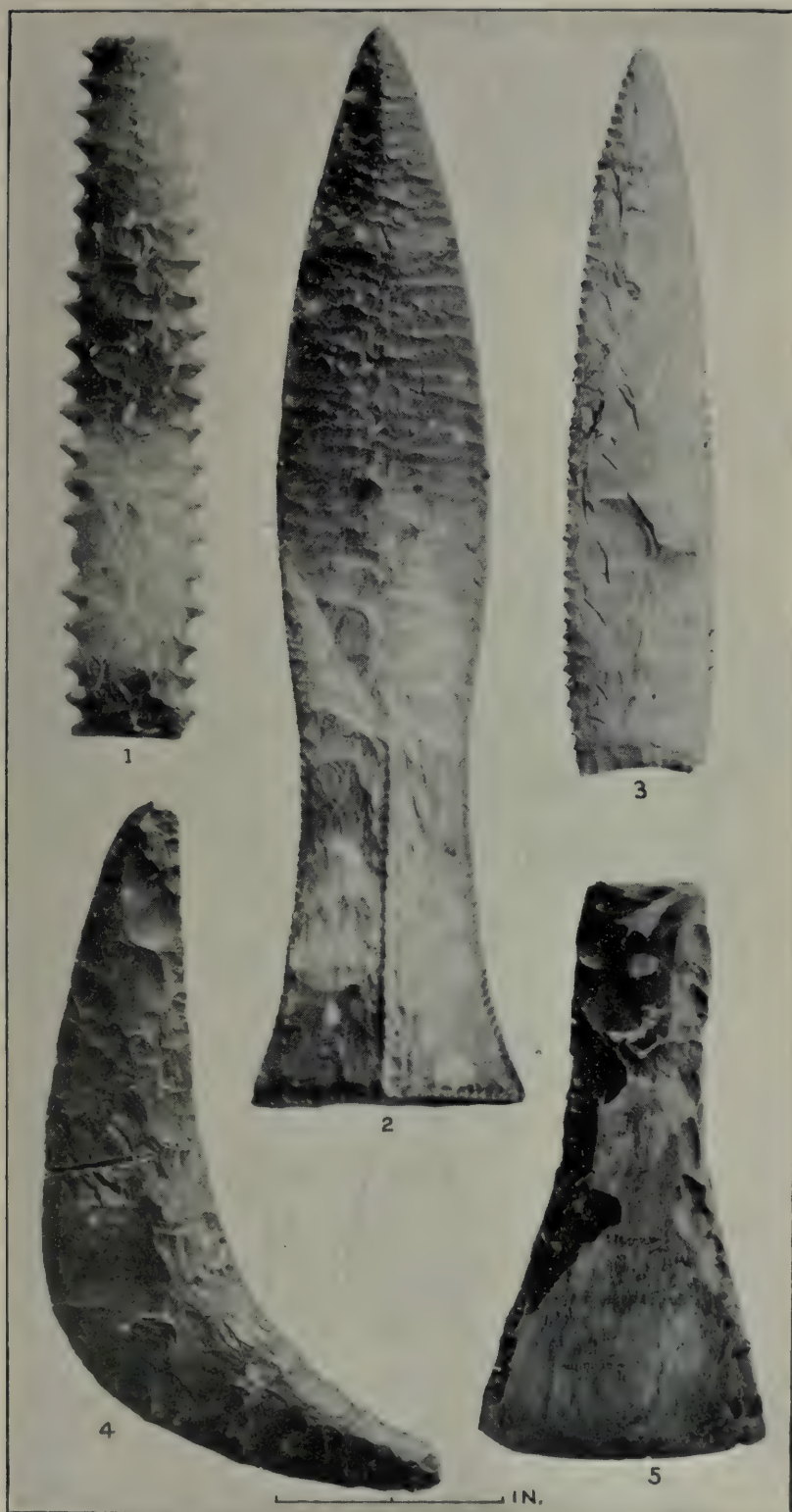


PLATE 5.—NEOLITHIC FLINT IMPLEMENTS, DENMARK.
(Cases 143-146, L, *see* pp. 99, 118)

with herring-bone and linear patterns, and round pits that sometimes occur on British neolithic ware. The Arctic people were hunters and fishermen, while in southern Scandinavia agriculture and domestic animals betokened a higher civilisation. Round the coasts of the peninsula, in Finland and in the Baltic provinces of Russia, are traces of one and the same culture, but in Götaland and south Norway the two are blended. The cordoned vases, which were evidently introduced from the south and correspond to our 'drinking-cups,' are wanting in the Scandinavian area with the exception of the Danish peninsula. A few neolithic vessels of other types (fig. 103) are exhibited in Wall-case 36 (below), and a selection of Danish flint and stone objects in Table-case L.

Cases 141, 142.

These Cases contain, on the shelves and slopes, flint celts chiefly of rectangular section, but including all the varieties found



FIG. 104.—Flint gouge, Denmark. [$\frac{1}{3}$]

in the dolmens, passage - graves, and cists of Scandinavia (p. 99). They are either merely chipped into shape or chipped and polished,

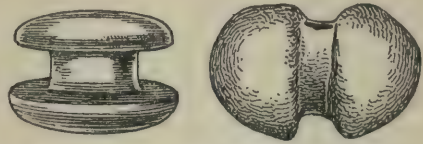


FIG. 105.—Amber stud and model axe-head, Denmark. [$\frac{1}{3}$]

either entirely or merely on the faces. Several polished gouges (fig. 104) are shown, and below are exceptionally large Danish celts made of stones other than flint. On *boards at the back* are Danish celts of flint, perforated axe-hammers, and amber models generally in the form of a double axe (fig. 105). Also some flint cores and

blades that may have been struck from them, some round-headed scrapers larger than English specimens, and roughly shaped flints—perhaps unfinished celts.

Cases 143, 144.

On the *top slope* are stone celts with convex faces and perforated butt; and pierced axe-hammers of stone with round shaft-holes; some are of simple form like examples from Russia (fig. 97), others are ribbed and carved in a manner foreign to stone and suggesting a bronze model. More elaborate axe-hammers (fig. 128)

are shown on the *first shelf* with a number of flint chisels (fig. 106) of square section. On *boards at the back* are more chisels and daggers of flint, a pottery vase, and heavy axe-hammers of simple form resembling a common type in north England. On the *lower slope* are flint celts of oblong section or with convex faces, polished more or less completely or else left in the chipped condition.

Cases 145, 146.

On the *top and bottom slopes* are large celts from Denmark, some of unusual dimensions and with the sides squared, very similar to what may be called the Cumbrian type (fig. 95). On



FIG. 106.—Flint chisel, Denmark. [$\frac{1}{3}$]



FIG. 107.—Unfinished axe-hammer, Denmark. [$\frac{1}{3}$]

the shelves are mace-heads and axe-hammers, some with the perforation incomplete (fig. 107); in the former case the incomplete implement suggests the hollowed pebbles of other localities (p. 115). Large axe-heads from Denmark and flint celts from Sweden are also shown here, and on *boards at the back* are crescentic blades more or less serrated along the edges, and perhaps used as sickles, from Denmark, Sweden and Norway. From Denmark also come

some points with teeth along the edges (pl. 5, nos. 1, 3), perhaps used as harpoon-heads, and several amber beads, evidently worn on a necklace.

Case 147.

With the exception of Egypt, **Africa** appears to have passed directly from the use of stone to that of iron, there being apparently no traces of an African Bronze Age. It is impossible to say at what time iron implements superseded those of stone in uncivilised regions, but the change must have taken place earlier in the eastern half of the continent than the west, for in early times migrations in Africa undoubtedly took a westerly or southerly direction. When the great era of African discovery opened in the fifteenth century, natives of the extreme west were already in possession of iron. Only among the Bushmen in the south and the Bube of Fernando Po did stone implements and weapons continue in general use down to modern times (see examples in the Ethnographical Gallery, Wall-case 53); in other parts they were regarded as thunderbolts, and held in superstitious veneration.

Varieties of the hand-axe (*coup-de-poing*) are widely distributed over South Africa, from the south coast to the Zambesi, but geological evidence of their age has rarely been obtained. Discoveries have been made in the river gravels above and below the Victoria Falls by Major Feilden and Mr. Lamplugh (specimens in this Case), also by Mr. Henry Balfour, whose hand-axes in the Pitt-Rivers Museum at Oxford are certainly of palaeolithic types. The gloss on some of the chalcedony flakes has not been satisfactorily explained, nor is it possible at present to account for the different mineral condition of the finds. It has been contended by Mr. Codrington that the gravels below the Falls do not belong to the Zambesi, but have been washed down from the basin of its tributary the Maramba, where serious floods occur even at the present day, depositing quantities of gravel in the neighbourhood of Victoria Falls.

A recent find in the Umhlatuzane river valley near Mariannhill, Natal, confirms the opinion that the hand-axes of Africa and Europe belong equally to the Drift period. A specimen of reddish porphyry, quite unrolled and with evident traces of human work, was found in a bed of white sand nearly 20 feet from the surface. There had been an attempt to make a cutting edge all round as in the Drift of Europe, but it remains to be proved whether there was a similar development in Africa or whether the hand-axe remained the typical implement till comparatively recent times. Stone implements, symmetrically chipped on both faces somewhat in the St. Acheul style, are shown from Rustenburg, Transvaal, and

from the surface on the Mhabana river, a tributary of the Little Usutu, Swaziland. From the Cape Flats come worked flakes of various stones, including some resembling the so-called Moustier points and others like the laurel-leaf flints of Solutré. These may simply be chance coincidences, and the pottery looks much later, having countersunk handles; that is, the wall of the vessel is indented to form a passage for a cord or the finger, with openings on either side of a knob or handle.

Quartzite flakes have been found in the gravel, Buffalo Drift, East London, Cape Colony; and flake-tools come from a cave on the Umdowaan river, Griqualand East, while others from a cave at Broken Hill, North-east Rhodesia, are of quartz. Minute flakes found on the Kalahari Desert with beads of ostrich egg-shell (and probably used for perforating them) may be related to the pygmy implements found in various and isolated parts of the world (p. 126).

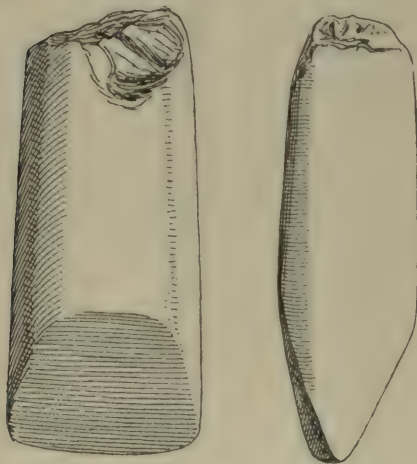


FIG. 108.—Cylindrical stone implement, Gold Coast. [3]

Stone implements from West Africa are often of cylindrical form (fig. 108), and specimens are shown from Odumasi, near the Volta river; from the province of Aquapim, on the Gold Coast; and from a site 15 miles south of Kumasi, Ashanti.

Below the main shelf are roughly chipped implements of Drift type from the top of Witwatersrand, Transvaal; some large quartzite implements and one smaller, much resembling St. Acheul work, found near Paarl, Cape Town; and several perforated stones of mace-head form. One heavy specimen, found 7100 feet above the sea in Ovampoland, is strongly suggestive of the weights on Bushman digging-sticks.

Case 148.

Top shelf, boards at the back, and top of Case 149: Selected implements (plate 6) obtained in **Somaliland** in 1894 and later, by Mr. H. W. Seton-Karr. The form of the larger implements is strikingly similar to that of the specimens from the river drifts of Europe (Cases 100-110). They were not, however, found under similar geological conditions, but on the slopes of a hill near the Issutugan river, having been apparently exposed by the action of the



PLATE 6.—CHERT IMPLEMENTS OF PALAEOLITHIC FORMS, SOMALILAND.
(Cases 148, 149, see p. 104)

rain, about 200 feet above the present level of the river. Bones of extinct animals were also absent, as is usual in Africa, where such remains are recorded in conjunction with stone implements only at Lake Karâr in Algeria. The smaller implements are found over a wider area, and for them palaeolithic age has not been claimed. They are mostly 'points,' but there are a few blades and conical cores.

On the *second shelf* the Stone Age of **Algeria** is represented by a cast of a drift-type from Batna; and later stages by implements of almost circular section, one measuring 11 inches in length; three polished celts found with pottery in the Caverne du Grand Rocher; and finely worked arrowheads with barbs, from dolmens at Guyotville, near Algiers. These last may belong to the Bronze Age, as a similar specimen was found with a bronze armlet at Staouli.

The series of flint arrowheads, points and scrapers, with two polished stone celts from the **Sahara**, Western Mauretania, resemble closely some recent finds on the southern border of Tunis, and also at Cape Blanco on the Atlantic coast, where the French and Spanish territories are divided. Such relics of a former population are found on the surface, and point to a racial connection between the neolithic inhabitants of the Sahara fringe. The barbs of several arrowheads project from the edges at an angle, and the work is of fine quality. Except that they are frequently worked only on one face, other patterns closely resemble those from neolithic sites in Europe, and more particularly some from Italy, which are long in proportion to their breadth.

The *third shelf* contains remarkably fine polished axes of haematite (fig. 109) from Mount Tina, near the Bomokandi river, in the north-east of the Congo Free State; and from the district between Rohl and Makrarka, further north. These axes are regarded by the present natives as thunderbolts, and used as remedies for sickness (p. 121).

On *boards at the back* are chert flakes from Wadi Magarah, Mount Sinai, and from a ledge of limestone at Beit Sahur (Beth Saour), near Bethlehem. Palestine is further represented by serrated flakes from Tell el-Hesy (Lachish). *Below* are quartzite implements of laurel-leaf and oval forms from the country between Matadi and Stanley Falls, Congo Free State.



FIG. 109.—Celt of haematite, Upper Congo. [$\frac{1}{3}$]

Case 149.

On the *second shelf* are chert flakes, hammer-stones, and fragments of pottery from Wadi Halfa, near the Nile, at the second cataract, across the Nubian border; and an implement of Chelles type from the desert hills west of Esneh, Upper Egypt. On a *board at the back* is a good series of the typical pinkish cherty flint of Egypt, comprising blades with saw-edges, blades used as end-scrapers or planes, and round-scrapers: they were found on the site of an early foreign settlement near Naqada, Upper Egypt.

The *third shelf and slope below* contain a series of flint tools of various types and patinations, found in the desert on the west bank of the Nile near Thebes. The two faces are rarely coloured alike, and the difference is no doubt due to their unequal exposure on the surface, where an enormous quantity of tools and flint *débris* belonging to various periods has lain undisturbed for ages. Mounted on *boards at the back* are blades, points, scrapers, a borer and both long and conical cores from which flakes were struck, from Ras Beirût, Syria; and a series from Sur Baher, near Jerusalem, including implements like 'fabricators' (p. 89), chisels with the edge formed by a transverse flake (p. 84), and other forms which resemble some of the palaeolithic period; and as examples of the earlier period have been found at the same place (Case 109), it is possible that relics of various ages are mingled on the surface, as is the case in Egypt.

It is now commonly agreed that the north-east corner of Africa was occupied by man at a very remote period, and that **Egypt** had a palaeolithic age. At that distant time the fertile country was not, as at present, confined to the valley of the Nile. Districts on both sides of the river, which are now barren, then received a plentiful rainfall, and were covered by a profuse vegetation. Most of the Egyptian implements which resemble those found in the river drifts of Europe have been picked up on the surface of the desert, and as a rule there is little to determine their age other than their palaeolithic form and the condition of their surface. Flint long exposed to the scorching sun of Egypt becomes tinted in many gradations of colour varying from a pale buff to deep orange brown, but it would be hazardous to assume a connection between the antiquity of an implement and the comparative intensity of its discoloration. More reliable evidence of age is afforded by General Pitt-Rivers' discovery in 1881 in the neighbourhood of Thebes of flint tools, undoubtedly chipped by man, lying imbedded in indurated gravel of a very ancient formation, and by more recent discoveries of implements in similar positions, and by Prof. W. M. Flinders Petrie. The one thing needful, however, the presence with the implements, in an

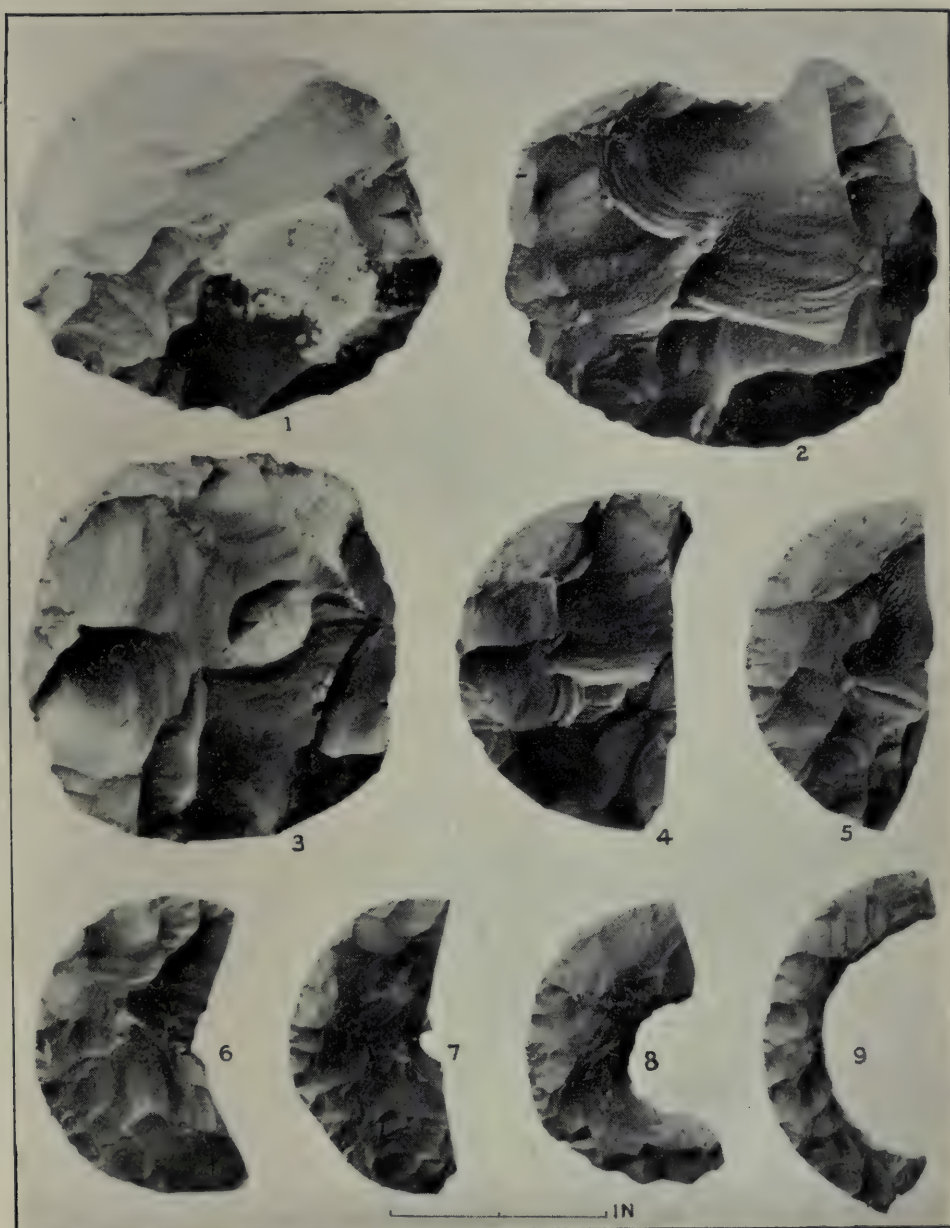


PLATE 7.—STAGES IN MANUFACTURE OF FLINT ARMLET, NILE VALLEY.
(Case 150, *see* p. 108)

undisturbed stratum, of remains of animals belonging to species now extinct, has not yet been produced from Egypt. The tendency of ancient forms to persist through later periods should therefore caution us against assigning *all* Egyptian finds of palaeolithic appearance to the age of the European drift; for, in the words of General Pitt-Rivers: 'Flints found on the surface of the soil cannot be legitimately disconnected from flints of the surface period except by form; and form alone is not conclusive in determining date.'

If the Drift types are to be referred to the palaeolithic period, others may imply a subsequent neolithic stage, but little is known of that period in spite of the extant material. What is called the pre-dynastic period has not at present been measured in years, and is not a true neolithic period, as copper is found even in its earliest stages, when the tall red-ware jars with black rims were being produced (Case 49); but stone was also in constant use, and reached its highest development before the dynasties began.

The use of stone implements in Egypt was not confined to the prehistoric period which ceased about 4500 B.C., but was continued for domestic as well as ceremonial purposes into historical times. Certain forms of stone axes have even been associated with particular dynasties. In Case 152, shelf 2, are exhibited axes of characteristic shape ascribed to the 12th dynasty and found at Kahun; they are similar in shape to bronze axes from the same site, and it is supposed that the one form was derived from the other.

Perhaps the finest chipped flint implements in existence come from Egypt, where they were produced in the period immediately preceding the dawn of history. Several of these may be seen in Cases 150, 151, while others are exhibited in the Department of Egyptian and Assyrian antiquities. Remarkable examples of the flint-workers' skill are also the chipped bangles produced from a thin disc by perforating it in the centre, an operation extremely liable to result in the fracture of the whole. A series illustrating the manufacture of such bracelets will be seen at the end of the second shelf of Case 150. It may be added that ground axes are rare in Egypt, the great majority being simply chipped.

Cases 150, 151.

(*Note.*—Another series of prehistoric remains from Egypt is exhibited in the Third Egyptian Room).

Top slope: Flat utensils of schist, some intended to represent animals, and sometimes used as palettes on which colours were rubbed. These objects may have had a totemic significance and

were made throughout the pre-dynastic period, during which the outlines gradually lost their naturalistic character, and became merely symbolic.

First shelf: Finely chipped flint knives with ripple-flaking, of various forms from different sites, belonging to the pre-dynastic period (figs. 110, 111), specimens from the early dynastic tombs being of rougher workmanship but more elaborate form.

Chipped lance-heads from Hâu and Abydos, with fish-tail ends



FIG. 110.—Chipped flint knife, Sheikh Hamadeh, Egypt. [$\frac{1}{2}$]

and partly serrated edges of exceptionally delicate work, were perhaps used to hamstring animals, and flint bangles from the same sites show extraordinary skill. On *boards at the back* are arrow-heads, implements and flakes from the Fayûm, the neighbourhood of the pyramids at Gîzeh, and other sites; also a series to illustrate the method of manufacturing flint bangles from the Wadi esh-Sheikh, halfway between Cairo and Siût (plate 7). A similar industry has been found on two sites in the Dept. Allier, France.

Second shelf: Chipped instruments of pre-dynastic forms from

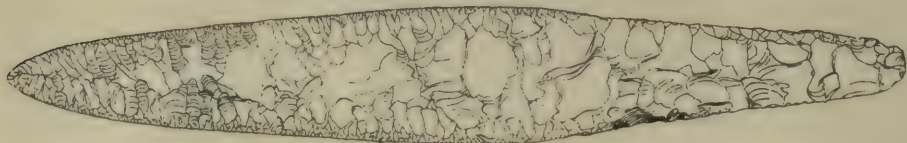


FIG. 111.—Chipped flint knife, Tell-el-Amarna, Egypt. [$\frac{1}{3}$]

Coptos and Abydos, arrow-heads from Tuna, and parts of sickle-blades from Akhmîm and Karnak. Two small polished axe-heads, pierced for suspension, were no doubt worn as charms, as in later times (p. 121), and the polished stone celts from Coptos and Abydos bear a general resemblance to those from other parts of the eastern Mediterranean (Cases 139, 140). On *boards* are flint scrapers from Thebes and Abydos, flakes and sickle-blades

(or saws) from Lower Egypt, and more polished stone celts, chiefly from Thebes.

Lower slope : Series of chipped implements from the Wadi esh-Sheikh and the Wadi Sagûr, in the desert to the east of the Nile, where they were discovered by Mr. H. W. Seton-Karr in 1896 (plate 8). Besides axe-like implements, knives, and cores there are clumsier tools considered to have been used for agricultural purposes. Though some of the specimens have analogies with those of the Drift period in Europe, the majority, if not all, belong to pre-dynastic and dynastic times. They were discovered on the surface, around shallow pits from which the chert had been extracted, situated in terraces descending from the plateau to the dry valleys, and on ledges on the sides of the cliffs. The pits often surrounded a central working-place where the raw material was chipped into shape. An interesting feature of this find is the counterchanged appearance of several specimens, showing the unequal weathering of different portions of broken implements. Fragments belonging together have been lying exposed on the surface for an indefinite period on different faces, and when again joined together show different degrees of patination. The original colour of the best flint in Egypt, always of a somewhat cherty nature, is fawn sometimes with a pinkish hue, and exposure to the atmosphere alters it to a chocolate or chestnut brown or even black, the shades varying according to circumstances. This should serve as a caution against dating implements by their degree of patination, which is, however, a useful index of horizon in the case of stratified deposits. It should be observed that exposure on the surface plays an important part in patination, and it is a question whether burial in gravel has any appreciable effect on flints, which are often patinated before they reach that position.

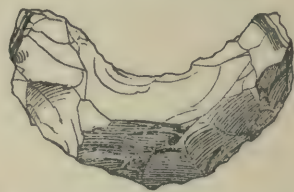


FIG. 112.—Crescent-shaped implement, Egypt. [$\frac{1}{3}$]

The so-called palettes of schist on *boards at the back* of the top and bottom shelves have been already mentioned. On the *top shelf* are chipped implements from Luxor, and crescent-shaped implements from Beit Khallâf, Upper Egypt (fig. 112). Two oval outer flakes of scraper form should be noticed, as the working edge is in each case serrated; they are called combs by Professor Petrie. On *boards* are flakes and minute worked points from Helwân, which should be compared with the small flints from Hastings in Case 120, and those from the hills of East Lancashire in Table-Case M, from Spain in Table-Case K, and from India in Wall-case 44 below. Curious facts about the distribution of these 'pygmy' flints are given below (p. 126), and various sugges-

tions have been made as to their use, some supposing that they were used as arrow-heads, as lateral barbs for harpoons (Table-case L), as fish-snags or borers for fine work, as for perforating ostrich-egg beads (Case 147).



FIG. 113.—Flint axe-head, Kahun, Egypt. [$\frac{1}{3}$]



FIG. 114.—Stone axe-head, Kahun, Egypt. [$\frac{1}{3}$]

Second shelf: Limestone mace-head, resembling one from Hierapolis (Case 139), chipped flint knives and axe-heads, and axes of characteristic form (figs. 113, 114) from Kahun, attributed to the twelfth dynasty (about 2450—2250, B.C.). Flint scrapers are also shown from a tomb of the fourth dynasty at Mèdum (about 3750—3600, B.C.).

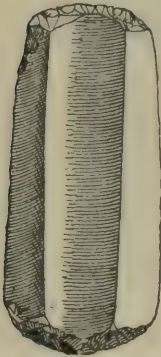


FIG. 115.—Flint plane, early dynastic tomb, Egypt. [$\frac{1}{3}$]

On *boards*, flint knives, scrapers, and flakes from tombs of the first two dynasties (4400—4000, B.C.) at Abydos, some accompanied by copper implements and models of implements, the whole excavated by Professor W. M. Flinders Petrie, and given by the Committee of the Egypt Exploration Fund; chipped chert implements from Medinet el-Fayûm. The resemblance of a common form of scraper (fig. 115) to some from the French caves should be noticed.

On the *floor of the Case* are chipped implements (one of unusual dimensions) from Abydos that somewhat strikingly resemble specimens from the Drift of Europe, but at present cannot be attributed with confidence to the middle Quaternary period.

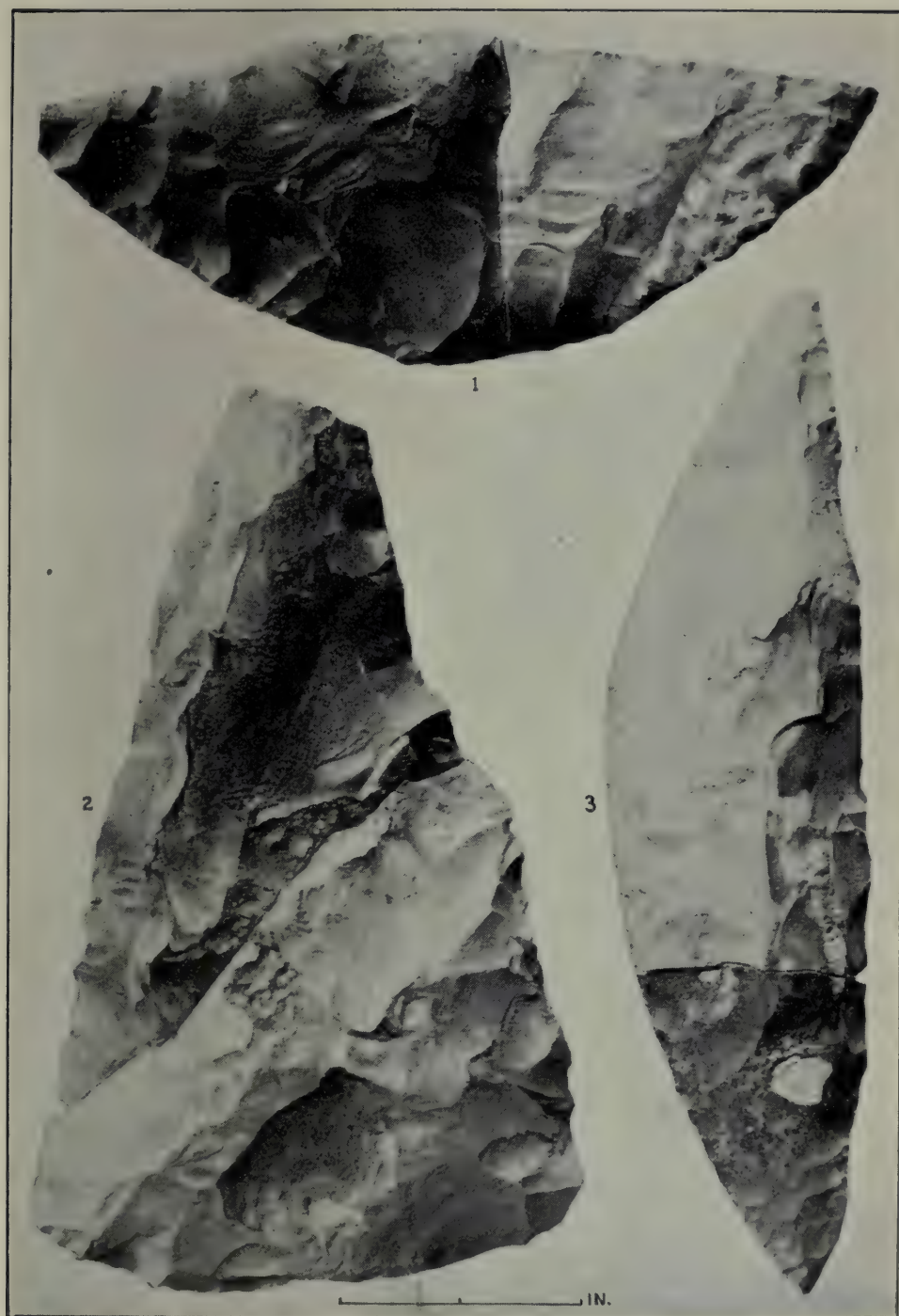


PLATE 8.—BROKEN IMPLEMENTS SHOWING UNEQUAL WEATHERING, EGYPT.
(Cases 150, 151, *see* p. 109)

Cases 49, 50.

These Cases are immediately below those just described and continue the Egyptian series. In the middle is a series of pre-dynastic pottery made without the potter's wheel some time before 4500 B.C., and of surprising excellence both in form and colouring. The red ware vessels are finished near the top with a black deposit (made by heaping cinders round that part of the vessel when inverted for firing), and one bowl is thus coloured all over the interior. A thicker pinkish ware has painted decoration consisting of spirals, lattice and herring-bone patterns, and also a design that has been variously interpreted as a ship or enclosure (kraal) perhaps periodically surrounded by water. On the *right* is a flint series of palaeolithic forms and several 'hollow-scrapers,' found on low spurs and terraces above Thebes and Erment, Upper Egypt, and 550–800 feet above the Nile. Others from the High Gebel plateau in the Western Thebaid were 1,000 feet above the river. A few flints accidentally polished by the sand are shown from the neighbourhood of Girgeh, Upper Egypt.

Below is a selection from a number of typical flints collected and presented by Dr. Schweinfurth, whose labels are attached to each specimen. They came from the district of Thebes, Upper Egypt, and are held to show the development from eolithic forms through a transitional series to the well-known palaeolithic types of Europe. Positive proof of such a succession is still wanting, as flints lying on the surface (as most of these were) may be of any age or of all ages together, but the series incidentally shows the variety of colouring in flints exposed more or less to the Egyptian climate for an indefinite period. Adjoining is a view with diagram showing the exact position in which eolithic forms were found.

Cases 40, 41.

The remains of the Stone Age in **Japan** have been chiefly found near the coast, and in those parts of the islands which are known to have once been inhabited by the ancestors of the present Ainu of Yezo and Saghalien. The most primitive implements are those discovered in shell-mounds, resembling the 'kitchen-middens' of Europe (p. 84), where they occur in association with broken pottery and remains of the deer, boar, fox and bear, the hollow bones being frequently broken, probably with a view to the extraction of the marrow. Some of the designs impressed upon the pottery recall those which the modern Ainu still carve on their wooden utensils or sew on their woven garments. The

formation of these shell-mounds must have extended over a long period, for they are found not only at many points on the coast of the main island, but also far south in Kyūshiū, where the Japanese crossed from the mainland at an unknown time before the Christian era. The invaders were from the first in possession of bronze, while their pottery was quite different in character from that of the kitchen-middens. As they steadily drove the Ainu northwards, the more southerly shell-mounds may be considered to date at least from several centuries B.C. Those further north may be proportionately less ancient as they approach the district still occupied by the Ainu, that people having learned the use of metal only in comparatively modern times.

Top slope : Fragments of pottery with impressed designs from



FIG. 116.—Chipped stone knives, Japan. [4]

shell-mounds in the province of Musashi; example of the curious stone objects, called by the modern Japanese 'thunder-mallets' found on the same site, and perhaps a symbol of authority.

Middle shelf and boards at back : Ground stone axes of various types both with oval and oblong section; chipped knives, arrow-points and drills, many being of obsidian, chiefly from Hakodate, Yezo; especially characteristic are the small knives with projecting knobs at the butt or back, probably to afford a hold for binding it to a thong (fig. 116).

Lower shelf and slope : Pottery with incised and stamped designs, including some perfect vessels; fragments of stone

'thunder-mallets' (fig. 117); and a series from kitchen-middens (shell-mounds) at Otaru, Yezo, where obsidian arrow-heads are seen to predominate. The type with crescentic base is the commonest here, but tanged specimens also occur, and the barbs (if any) are rudimentary, and seldom form a continuation of the sides as in Europe.

Cases 42, 43.

The geological evidence afforded by the formations in which chipped implements of palaeolithic type have been discovered may be held to prove the existence of a palaeolithic age in **India**. Mr. R. Bruce Foote has shown that in the valley of the Sabarmati River in Gujarat a vertical distance of about 200 feet separates the neolithic implements found on the surface from those of more primitive form buried beneath the alluvium of an ancient river system below. Moreover, the nature and depth of the intervening deposits justify us in assigning a very great antiquity to the implements which underlie them. Similar though less perfect evidence is supplied by the discovery of rudely chipped tools of quartzite imbedded in the laterite (red ferruginous clay) which clothes the flanks of the Eastern ghats in the Madras Presidency. To these beds a marine origin has been attributed by some geologists; and if this theory is correct, their presence, in some cases at an elevation of several hundred feet above the present sea-level, would indicate that the coast has been raised to this height since the time when the men who made these rude implements occupied the district. Other authorities, however, consider the laterite to be a fresh-water deposit. The presumption of high antiquity on geological grounds is confirmed by the forms of the implements themselves, which often strikingly resemble those of the ancient river drifts of Western Europe. It is much to be regretted that these Indian strata have hitherto afforded no example of primitive implements lying in undisturbed association with the bones of extinct animals.

The Neolithic age in India is represented by discoveries from various parts of the peninsula, showing that the culture of this period was very widely distributed. Attention may be especially directed to the comparatively frequent use of hard stones, such as jasper, from which very small flakes were struck; the neighbourhood of Jabalpur has been especially prolific in these remains, which are remarkable for the high proportion



FIG. 117.—
Part of
'thunder-
mallet,'
Japan. [1]

borne by the cores to the flakes discovered. The collection is not rich in neolithic implements from the countries adjacent to India; but it contains a few specimens from Burmah, the Malay Peninsula, Cambodia, and Java. Among these the Malay examples exhibit marked peculiarities, shared by those from the neighbouring islands, and the stone implements of the Malay peninsula are usually ascribed not to the primitive negrito tribes of the interior, nor to their ancestors, but rather to peoples of higher civilisation who entered the country at a later period.

The *central part* of the Cases is largely occupied by quartzite implements of palaeolithic form from the laterite deposits in the Madras, Nellore and North Arcot districts of Southern India, and



FIG. 118.—Flint core, Rohri Hills, Indus. [3]

by collections of rudely-chipped implements from Mirzapur and Raipur in the North. The objects illustrated on plate 9 all find a parallel in the products of the river-drift in this country and may well belong to the corresponding period. With the wedge-shaped implement (no. 1) should be compared the flint specimen in Case 105, from the contorted drift at Stoke Newington, London; no. 2 is of the common pear-shaped type, and no. 3 closely resembles several examples in flint exhibited in Case 103, and found in drift-gravel at Santon Downham and other sites in Suffolk (fig. 16). On *boards at the back* are flakes and cores of cherty flint from Rohri and Sakkar (Sukkur) on the Lower Indus (fig. 118), which are found in considerable quantity but not in association with any finished implement.

On the *lower shelves* are implements of Drift forms from Raipur on the Jumna; Tripaty and other sites in Madras Presidency; the Singrauli basin, Mirzapur; and Pennar river-valley, Cuddapah. The neolithic forms exhibited come from Bellary, Southern India, and include both chipped and polished examples, the butts being pointed in several instances and the section generally oval, though some of stone with slaty fracture have flat faces.

Cases 44, 45.

These Cases contain principally chipped and ground stone axe-heads, hammers and other implements from the Kaimur range in Central India, the North-west Provinces and the Shevaroy Hills

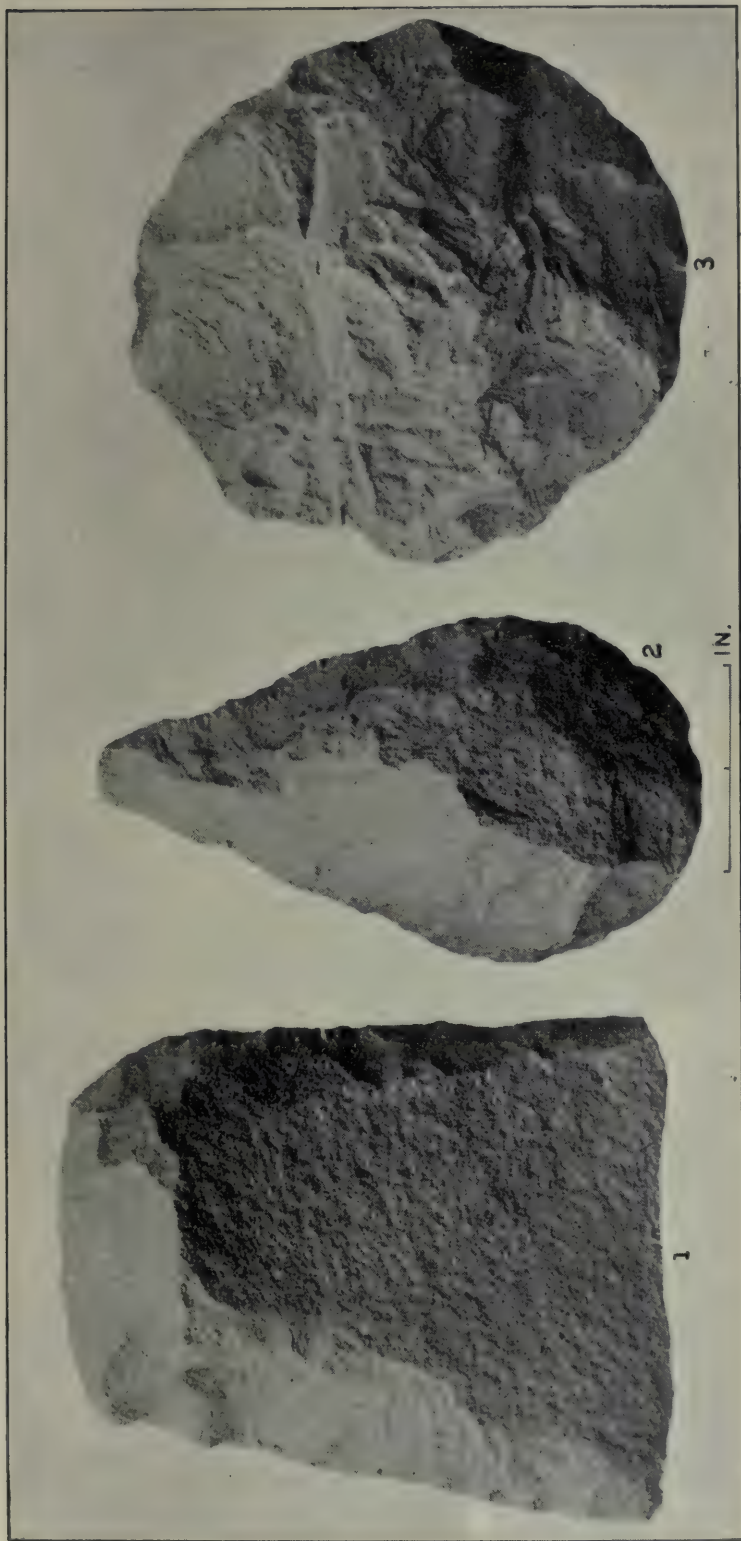


PLATE 9.—QUARTZITE IMPLEMENTS FROM LATERITE BEDS, MADRAS.

(Cases 42, 43, see p. 114)

in the Madras Presidency (fig. 119). The chipped specimens (as some from the Banda district, west of Allahabad) are generally ground at the cutting-edge, and all are doubtless of the same period, there being no Drift types in this series. Various hollowed stones (p. 91) will be noticed, both oval hammers and celts, but here at least there can be little doubt that the hollows are the beginnings of shaft-holes or grooves, which have never been completed. There are also grooved mallets (p. 91) and heavy ring-stones like the weights on the Bushman digging-sticks of South Africa.

On *boards at the back* are flakes and cores of chert, jasper, chalcedony, &c., from the Vindhya Hills, and from Jabalpur in the Central Provinces. Some of the worked flakes are exceedingly minute (fig. 120) and show forms characteristic of the so-called 'pygmy flints,' found in widely distant parts of the world (p. 126). They are not mere chips from a factory floor, but often tools in themselves, carefully worked to a definite pattern, and used for some purpose as yet unknown.



FIG. 119.—Stone axe-head, North-west Provinces, India. [†]

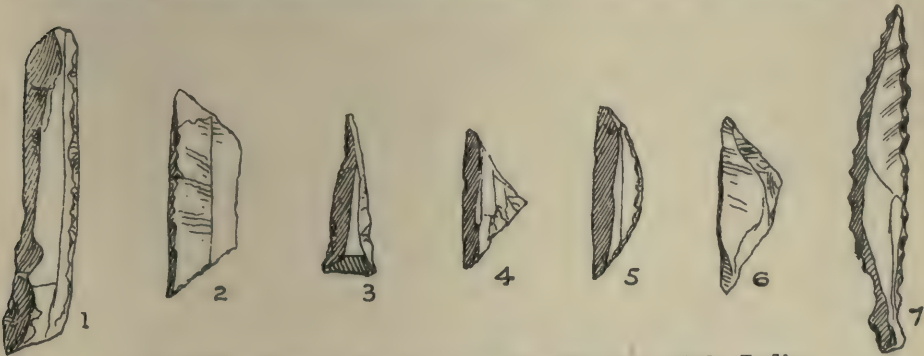


FIG. 120.—Pygmy flint implements, Vindhya Hills, India.

Cases 47, 48.

Northern **Asia** is represented by a series from kitchen-middens in Kamtchatka (in the same latitude as the British Isles), consisting of rudely chipped axe-heads of a slaty stone, net-sinkers, and 'points' of obsidian and jasper; but the stage of civilisation reached appears to have been lower than that of Northern

Scandinavia (p. 101). Ground and polished axe-heads from China (chiefly Momein in Yunnan) include a fine specimen of hard black stone, 9 inches long, somewhat resembling a Scandinavian form with squared sides, but furnished with a chisel edge. Adjoining this are two agate blades, one slightly curved, from Java, and characteristic of the same island are implements of triangular section, which except for the ridge would agree with other specimens from the East Indies. From Perak and Negri Sembilan, in the Malay Peninsula, come tools with squared faces and two sloping facets at the cutting end (fig. 121), the point being rounded on a specimen from Sumatra. The peculiar Burmese form, probably an adze, with square tang for hafting (fig. 122) has also been found in Cambodia and at Kosam on the Jumna, thirty miles above Allahabad in India. The shoulder



FIG. 121.—Stone celt, Negri Sembilan, Malacca. [$\frac{1}{4}$]

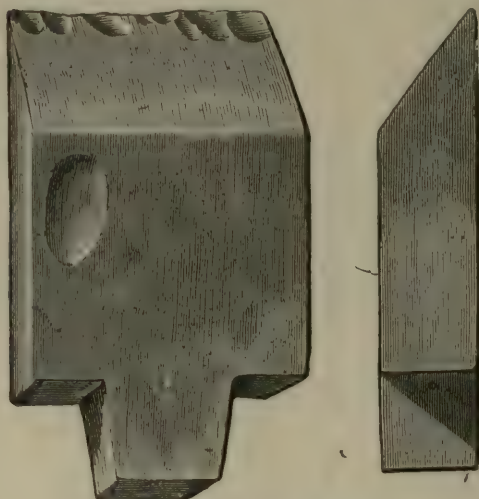


FIG. 122.—Stone adze-blade, Burmah. [$\frac{1}{2}$]

formation is also seen on a specimen from Momein, Yunnan. From the Great Lake, Cambodia, come also axes and adzes, beads, bracelets of shell, a fish-hook and spear-point of bone, and a peculiar ear-plug of pottery, incised with a cruciform pattern.

Table-case K.

In part of this case are exhibited objects from the district between Almeria and Cartagena in south-eastern Spain, excavated by MM. Henri and Louis Siret in 1881–1887. This collection is especially interesting because it covers the period of transition between the Stone and Bronze Ages, and it is therefore only with

the beginning of the series that this Guide is concerned. The objects were found at a slight depth beneath the surface, usually in graves containing several skeletons, and bounded by polygonal enclosures formed of stone slabs. The most characteristic specimens discovered were ground stone axes, usually of diorite, flint knives, scrapers, piercers and arrow-heads, pounders, stone bracelets or pendants, beads of steatite and shell, and coarse hand-made pottery. Those here exhibited are chiefly from the station at Campos.

On the opposite side of this Case is a group of originals and plaster casts which have been recently discussed. The specimen illustrated (fig. 123) was found with another 12 ft. deep in a hill between Vendas Novas and Beja, Portugal.

Schist amulets of axe-head and crook form have been frequently found in Central Portugal, mostly in connection with neolithic burials in caves. Their origin is obscure, but one type is evidently derived from the neolithic celt or stone axe, and the ornamentation of both types is purely geometrical, consisting of bands of hatched triangles, chevrons or chequer designs. The triangle predominates and it will be noticed that the hole for suspending the axe-type is enclosed in a triangular space. Such amulets have been published by M. Cartailhac and others, and more recently by M. Louis Siret, one of two brothers to whom the discovery and publication of the Spanish series in this Case are due. M. Siret holds that the triangle is symbolic of the female divinity or principle already recognised in the neolithic period not only in Spain but in other parts of the Mediterranean, as at Hissarlik (site of Troy) and in Crete, where the double-axe (conjoined triangles) is well known. In his opinion these coincidences point to a commercial or racial connection at that early date, and the triangle and allied symbols were gradually and unconsciously developed into quasi-human figures, such as the statuette from Adalia in Case J. In certain advanced areas human attributes were subsequently added to the primitive religious conceptions of early Europe; and Greek anthropomorphism may therefore be traced from such rude designs as those here shown, which offer some points of resemblance to the chalk 'idols' found in Yorkshire (Case F), and specimens of marble and terra-cotta from the Mediterranean countries (*Bronze Age Guide*, pp. 90, 119).



FIG. 123.—Engraved slate amulet, Portugal. [†]

Table-case L.

On the *east side*, a series from Denmark contains some of the best flint-work of the prehistoric period, some specimens probably dating from a time when metal (copper and bronze) had been introduced into countries nearer the centre of civilisation. Cores (fig. 124) from which flakes were struck are shown, and vary in size, the smallest having yielded flakes of 'pygmy' proportions. Scrapers and celts of various forms and degrees of finish, some being partially polished (pl. 5, no. 5); chisels of square section, and blades with serrated edges (nos. 1, 3), though not adapted for use as saws; and sickle-shaped knives (no. 4) are among the typical products of Denmark in the best flint period. Most surprising of all are the daggers, which often show ripple-flaking (like some from Egypt), and can be dated with some precision. The series begins with a leaf-shaped blade having coarser work at the butt, as in England and Europe generally. The butt gradually becomes thicker and longer (fig. 125) and acquires a lozenge section, both faces of the blade ending in a rib. The handle is then developed and chipped as carefully as the blade



FIG. 124.—Flint core, Denmark. [$\frac{1}{2}$]

(pl. 5, no. 2), the 'seam' down the middle of one or both sides of the handle being thought to imitate the stitches in an original leather casing. Knives with ripple-flaking are not found in the early dolmens, but in later tombs of that form as well as in gallery-graves and cists, generally showing the successive stages of development. Flint 'points' for lance or arrow-heads, with tang and triangular section, are elaborate productions which might have



FIG. 125.—Flint dagger, Denmark. [$\frac{1}{2}$]

been lost the first time they were used. Harpoon-heads of stag's horn set with sharp pieces of flint along two edges (fig. 126) may account for some of the 'pygmy' flints produced in various parts of the world; and an example of the 'transverse' arrow-head in a shaft with the original binding (fig. 127) shows how this type was used. One hammer-head has the perforation unfinished, and shows



FIG. 126.—Harpoon-head with flint barbs, Denmark. [$\frac{2}{3}$]

an advance on the hour-glass form of shaft-hole which contracted in the middle and was bored from both sides. Circular mace-heads and perforated axe-hammers (fig. 128) show extraordinary skill and a strong demand for beautiful weapons: the expanding edges of some examples point to an imitation of bronze models. It should be noted that the 'points' with triangular section, the serrated blades and crescent 'sickles' as well as the tanged and handled daggers, are all found both in Denmark and Egypt in practically identical forms, but apparently nowhere else. Some

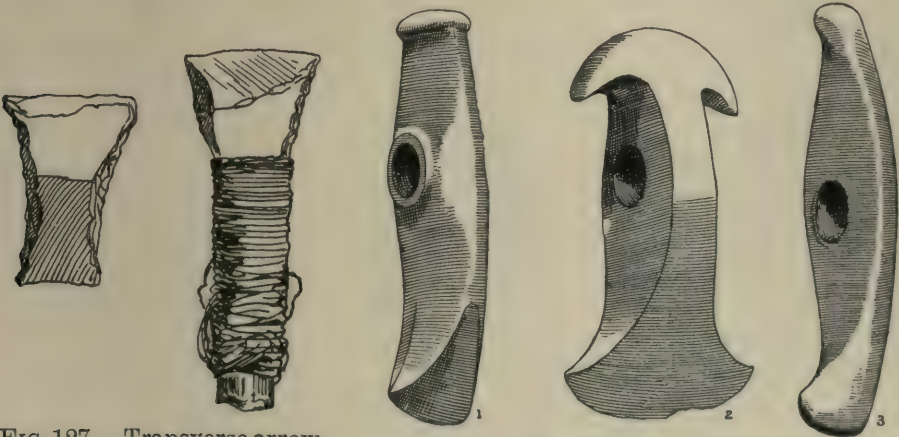


FIG. 127.—Transverse arrow-head with original binding, Denmark.

FIG. 128.—Pierced axe-hammers, Denmark. [$\frac{1}{4}$]

line of communication between the two countries in prehistoric times may yet be traced.

The *west side* of this Case contains both typical and exceptional forms of worked flint and other stone from foreign countries. Specimens of diorite, fibrolite, chloromelanite, greenstone and other hard materials are shown, all carefully polished; while flint specimens include transverse arrow-heads, cores, and flakes, some

of the last being of exceptional length and proving great skill on the part of the flint-worker. The resemblance between celts from the Seine and Thames will not escape notice.

A heavy axe-hammer found near Dresden is remarkable for its diagonal perforation, and there are unfinished examples of tubular boring of shaft-holes from Prussia and Bohemia. Among the Italian specimens should be noticed a stone celt of oval section with expanding cutting-edge as though copied from metal; an elaborate axe-hammer with hour-glass perforation, and a green stone celt with a small hole in one side for attachment, no doubt as an amulet. A flint blade with finely serrated edges has an unusual length of 11 inches. A large green stone celt obtained in Spain has a hole for a cord pierced near the cutting-edge, and the beginnings of another; and a few diminutive celts from

Greece are shown, with obsidian cores from Crete and the island of Ios, near Santorin. A heavy celt of oval section (fig. 129) found near Paphos is one of a very limited number found in Cyprus, where



FIG. 129.—Stone celt, Ktima, Cyprus. [$\frac{1}{4}$]



FIG. 130.—Flint arrow-heads, mounted as amulets.

copper began to be worked at a very early date, and the neolithic period was correspondingly short. A group of fourteen implements ploughed up south of Bhagalpur, Bengal, includes several types

and materials; and typical cores of cherty flint from the Indus are exhibited, of somewhat larger size than those in Case 42. Three diminutive implements of jade-like stone found near Mosul, Mesopotamia, closely resemble some from the Greek Islands and Asia Minor.

A ground nephrite axe-head obtained in Egypt and engraved with a Gnostic inscription probably added in Alexandria in the 4th century; flint flakes and arrow-heads worn as charms in Italy, one with an ancient Etruscan, another with a mediaeval setting (fig. 130); ground and polished jadeite axe with silver mount and perforated for suspension, said to have been worn in Scotland in the 19th century as a remedy for kidney-disease.

Table-case M.

In this Case are exhibited typical and exceptional specimens from Great Britain and Ireland to serve as an index series of the neolithic collection exhibited in Cases 125-133 of the gallery

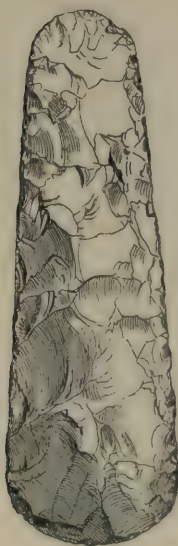


FIG. 131.—Un-ground axe-head, Hitcham, Bucks.
[4]

round this room, while the larger objects are accommodated in the glazed cupboards at the end of this and the adjoining Case. On the *east side* are chiefly celts, that is, implements of chisel form, the name implying no connection with the Keltic peoples, who came into western Europe during the latter part of the Bronze Age. When of stone, these implements are first chipped into shape, and often finished by polishing a part or the whole of the surface. A common form in the rough state from the Thames is shown; the average length is 9-10 inches, with a pointed or chisel end. Such tools may have been used



FIG. 132.—Ground flint axe-head, Thames. [4]

for excavating the chalk, in order to obtain raw material for other tools, or for hollowing out tree-trunks for canoes, probably with the aid of fire. Flint celts from the Thames generally have sharp sides and broad butts (figs. 131, 132), while specimens of other stones often have the sides rounded or squared, much like some of the Scandinavian type (fig. 102). The largest specimens with squared sides (fig. 95) come from the north-west of England

(the ancient Cumbria) and the north Midlands, but a large one of greenstone from Ireland is shown below, and the pattern was reproduced in flint in East Anglia. The use of jadeite and nephrite for neolithic implements has been already mentioned



FIG. 133.—Mace-head of 'cushion' type, Twickenham. [$\frac{1}{2}$]

(p. 94), and examples are here shown from the Thames at Vauxhall Bridge, Canterbury, and Brierlow, near Buxton, Derbyshire, the first two closely resembling some found near Mainz (casts in Case 134). Axe-hammers of various materials have shaft-holes either with straight sides or of the hour-glass pattern, the latter produced by a more primitive method and presumably earlier. Specimens of highly-developed form (such as the 'cushion' type) have straight perforations; and a few of coarser make have oval shaft-holes (fig. 144). A hollowed pebble from Winterbourne Bassett, Wilts, has evidently been used as a

hammer, but an adjoining specimen seems to prove that the hollow is nothing but the first step in perforating the stone for the insertion of a shaft. A celt from Llangwyllog, Anglesey, exemplifies the unsymmetrical cutting-edge often observed on even the best polished specimens, and due, no doubt, to the method of use. Several perforated hammers of highly-finished appearance in this Case may be called the 'pestle' type, and there is a cast of one from Maesmore, Corwen, Merionethshire, with a faceted ornament that has lately been found also on an axe-head of deer-antler from the Thames.

On the *west side* are perforated hammer-stones of 'pestle' type from Scotland and one of hornblende from Lough Gur, co. Limerick; also two unusual axeheads from the river Bann, Ireland, one being a simplification of the other. Special prominence has been given in the illustrations (plates 4, 10) to the flint arrow-heads and other points from Ireland, on account of their excellent workmanship and the variety of their forms. Some are ground on one or both faces (fig. 134) a peculiarity that is also found in Portugal. All the patterns here exhibited are supposed to be derived from the point with semicircular base, along two distinct lines. First the base becomes straight, making the whole triangular; the base is then notched in the middle and the two barbs



FIG. 134.—Polished arrow-head, Ireland.



PLATE 10.—NEOLITHIC LANCE AND ARROW-HEADS, IRELAND.
(Case M, *see* p. 122)

evolved, which eventually curve inwards or are further extended in the line of the sides. The other branch includes the lozenge, where the base is pointed. This feature develops into a tang which often accompanies the barbs already mentioned, but is thought to have been reduced to a mere stump on account of the inward curvature of the barbs. Good examples of these exaggerated forms may be seen in the series from the River of Egypt (p. 139).

The Scottish series also contains various forms of arrow-heads, of brightly-coloured flint; and a specimen from Bridlington, E.R. Yorks, shows the parallel flaking (fig. 135) that is rare in this country and was brought to perfection in Egypt (p. 108). Several 'Picts' knives' (fig. 136) of greenstone from the Shetland Islands, where 16 were found together in peat-moss 5-6 feet from the surface, resemble the blades used in recent times by the Eskimo of Alaska (Ethnographical Gallery, Case 186) for scraping skins and removing whale's blubber; and it is probable that the same kind of handle



FIG. 135.—Arrow-head with parallel flaking, Bridlington.

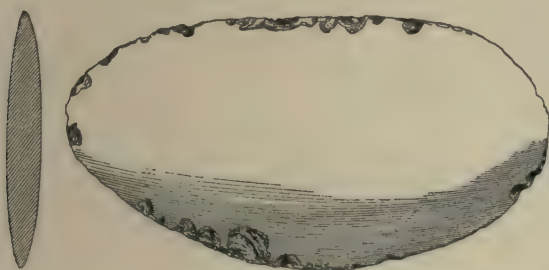


FIG. 136.—'Pict's knife,' Shetland Islands. [4]



FIG. 137.—Eskimo knife, Alaska. [3]



FIG. 138.—Flint knife, Thames. [3]

along one edge (fig. 137) was adopted in both localities. A series of broad flint blades (fig. 138) with point and tapering tang should be noticed as representing in this country the remarkable daggers of

Denmark (Case L). They are sometimes notched along the tang to secure the handle, and were no doubt mounted in the same way as modern examples from the north-west coast of America (fig. 139). They are found chiefly in the south of England, especially in the Thames, but there are examples from Middlesex, Essex, and the stone circle at Arbor Low, Derbyshire, where another peculiar implement (fig. 140) has also been found. The type is a flat oval

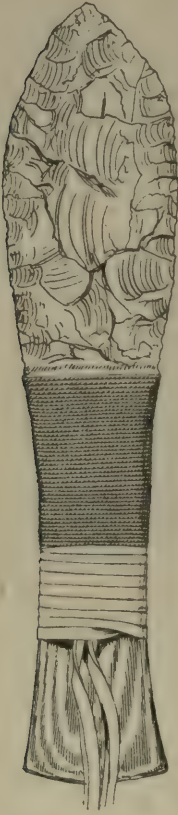


FIG. 139.—Flint knife mounted, North-west Coast, America. [$\frac{1}{3}$]



FIG. 140.—Round knife, Arbor Low. [$\frac{1}{2}$]

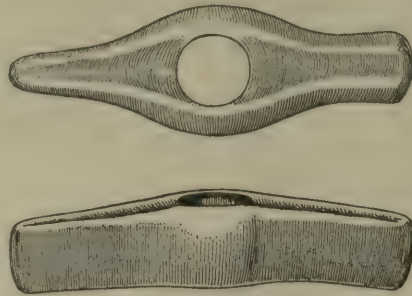


FIG. 141.—Stone axe-hammer, Toft Monks, Norfolk. [$\frac{1}{3}$]

or circular flint chipped on both faces and polished on the edges to form a cutting or scraping tool ; several examples are shown in this Case. A perforated axe-hammer from Toft Monks, Norfolk (fig. 141), and certain other specimens in the collection suggest a connection with Denmark in the neolithic or early Bronze period, when several flat axes of the earliest metallic form are known to have been exported to Sweden. A sickle from the Thames has been already noticed (p. 88), and the rougher work of this period

is represented by mace-heads made out of pebbles, sometimes unsymmetrical, and by chipped tools from Stourpaine, Dorset, which sometimes have a 'waist' and steep flaking at the cutting-edge, for use as an adze (fig. 142). The white surface is common on flints from the surface of the chalk area (p. 88), and is due both to decay and the infiltration of chalk. Flint rods, 3-4 inches long (fig. 93), are generally called 'fabricators' and supposed to have been used in flaking by pressure (fig. 160); but it is possible that they were used with lumps of iron pyrites as strike-a-lights in late Neolithic times, and this is the explanation given of Scandinavian specimens. Pyrites and flints, practically of the same form, have been found with Bronze Age burials in Yorkshire (fig. 94).

The scratches on a large number of flints found at Icklingham, Suffolk, by Dr. Allen Sturge, and in certain other English counties, are a problem as yet unsolved. Such markings on palaeolithic specimens would generally be attributed to striation by ice, which scratches the rocks and pebbles over which it passes by means of other stones frozen into its under surface. Great pressure and a sharp edge would be required to scratch the hardest kind of flint (such as the Icklingham specimens), and it is difficult to account for ice-action in the neolithic period, to which these obviously worked flints must be attributed. The patination is generally bluish, due to the original black showing through a film of white produced by molecular change in the surface; and the scratches are of various kinds, ranging from coarse grooves to hair lines, sometimes parallel, in parallel groups, or in all directions, and often most numerous on the projecting bulb of percussion. The white lines observed on some examples are due to pressure which has not been sufficient to break the surface, but has nevertheless bruised it along the line of contact. The great age of neolithic work is proved incidentally by the double patination of certain flints, the first flaked surface now being quite different from the edges, where subsequent chipping or use, after a long interval, has exposed a fresh surface that has since acquired more or less patination.

The so-called pygmy implements, made from diminutive flakes, are represented by specimens from the hills of East Lancashire (fig. 143) and the neighbourhood of Enstone, Oxfordshire. These minute and finely chipped specimens of characteristic crescent, triangular, and rhomboidal forms are found in India (Wall-case 44

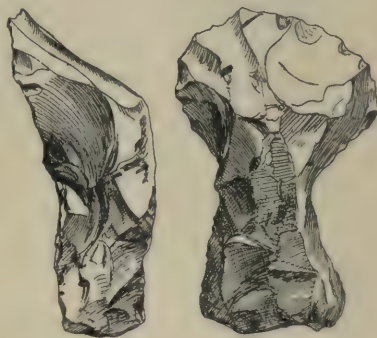


FIG. 142.—Flint adze, Stourpaine, Dorset. [4]

and p. 115), Palestine, Egypt (Case 152), North Africa, Southern Spain, France, Belgium, and in several sites in Great Britain, notably in Eastern Lancashire, Scunthorpe in Lincolnshire, Seven-oaks, and Hastings. The curious persistence of the same forms in all these countries has led to the conjecture that they are the work of one and the same race ; but the same argument might be



FIG. 143.—Pygmy flint implements, E. Lancashire.

used to prove that the barbed stone arrow-heads of Europe, Japan, and North America were the productions of a single people. However it may be explained, the similarity of form is sufficiently striking to deserve careful attention. Various conjectures have been made as to the use of these minute implements, which are manufactured from small flakes, the natural edges being in most cases left untouched, and the thicker sides or backs carefully finished by secondary chipping. Some have supposed that they were tied to the points of arrows, others that they formed lateral barbs of harpoons, others that they were tattooing-instruments,

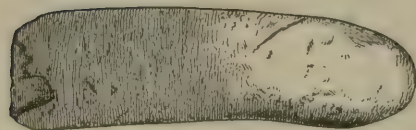
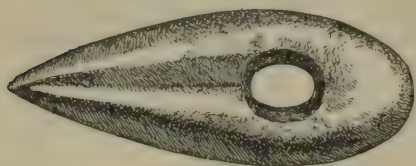


FIG. 144.—Stone axe-hammer,
Jervaulx, Yorks. [$\frac{1}{6}$]

others that they were fish-snags, or used for making holes in skins or even harder substances like shell. The last suggestion seems to be borne out in the case of the small points found in South Spain, as diminutive shell-discs were found in association with them ; but we need not assume that their use was in every case uniform, for very few show any signs of wear. The pygmy implements are assigned by some French and Belgian writers to an early stage of the neolithic period called *Tardenoisien* (after a site

at La Fère-en-Tardenois, Dépt. Aisne), and it is supposed that they continue the Madeleine tradition, as the tendency to minute implements is somewhat marked at the close of the Cave period. It has been observed that while they sometimes occur with types of the polished stone period, they are also found unmixed with

any larger stone implements, and may therefore represent an independent industry.

Below, at the end of Cases **K**, **L** and **M**, are large ground axe-hammers with round or oval shaft-holes, practically confined to Scotland and the northern counties of England. An average specimen (fig. 144) is 10 inches long and weighs 5 lb. 13 oz. In the chalk districts of the south flint nodules are often found that may have been used as hammers for flint-working or as missile weapons. A large pebble of green stone was probably used for crushing grain.

A tabular stone from Scotland has cup-shaped hollows probably due to its use as an anvil in flint-working; and may be compared with the hollowed pebbles in Cases **112**, **129**, **132** (see fig. 43). Grinding-stones of quartzite (fig. 145) were used for polishing

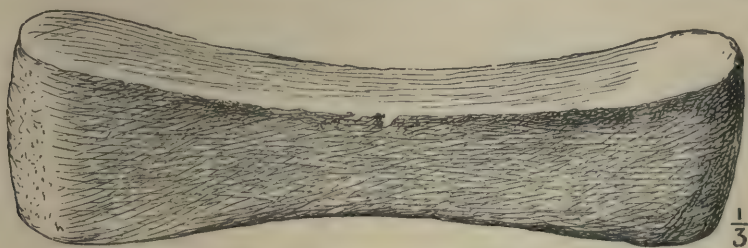


FIG. 145.— Grinding-stone, Dorchester, Oxon.

celts and other implements after they had been roughly shaped by chipping; and a large specimen, probably from Denmark, is exhibited at the foot of the eastern spiral staircase in this room.

Central Standard Case S.

The Swiss Lake Dwellings of the Stone Age.

In several parts of Europe, but more especially in Switzerland, primitive men lived for greater security in villages of wattle and daub raised upon high piles driven into the edges of the lakes. The settlements of this kind in the Swiss lakes are very numerous, and the antiquities discovered on the various sites show that this manner of life continued from neolithic times through the whole of the Bronze period into the earlier Iron Age. Attention was first drawn to the lake-dwellings during the exceptionally dry season of 1853, when piles were exposed on the shores of the lake of Zürich, and numerous antiquities brought to light; and in succeeding years similar settlements were discovered in most of the larger lakes as well as in several of smaller extent, such as Inkwył and Moossee-

dorf. The conditions obtaining in the smaller lakes have often been the most favourable from an archæological point of view, owing to the formation in the more tranquil and shallow waters of a deep layer of peat moss, which has acted as a preservative for the more perishable objects. In these smaller lakes the piles were often raised and strengthened by heaps of stones and stakes round their bases; in the larger, piles were used alone. In some cases, as in the island of Borneo at the present day, houses raised on piles may have been built on dry land, but as a rule the lake-dwellers must have lived actually over the water, just as in New Guinea men still live in pile-villages in the shallow waters of rivers and the sea (figs. 83, 84). The remains found on the sites of the pile-dwellings built and occupied in the Stone Age, of which that of Robenhausen is considered the typical example, show that at this period the number of domestic animals possessed by man was still small, and that food was largely furnished by the wilder species; oxen were numerous, but the sheep, horse, and domestic

pig were extremely rare, not becoming general until the Bronze period. Of the wild animals then inhabiting the district, but now no longer occurring in Switzerland, the urus, bison, elk, and stag were among the commonest.

But the lake-dwellers were no longer wholly dependent upon hunting for their livelihood. They cultivated wheat, barley, and millet, from which

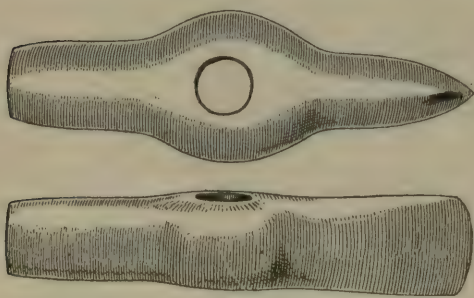


FIG. 146.—Perforated axe-hammer, Yverdon, Switzerland. [4]

they made a rough kind of bread; they preserved apples and pears, and were also acquainted with the raspberry and blackberry. Although skins were still largely used for clothing, flax was grown, and garments were woven from it. Not only spindle-whorls of stone and pottery, but even pieces of woven stuffs have come to light; and the numerous earthenware vessels which have been discovered show that the art of the potter had made considerable progress, although the use of the wheel was still unknown. The most important implement or weapon was the polished axe, which was commonly of small size and made of hard stone like diorite. It was often mounted in sockets of deer-antler and fixed in wooden hafts, the elasticity of the horn socket rendering the haft less liable to split. Other weapons and implements were flint arrow-heads, flakes and knives, rude stone hammers, and corn-crushers.

West side and shelves at south end: Objects from lake-dwellings

of the Stone Age on the lakes of Neuchâtel, Bienne, Constance, Moosseedorf, and Pfäffikon.

The chief part of the collections is mounted on *boards* upon

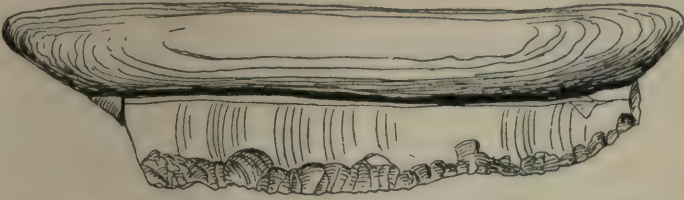


FIG. 147.—Flint knife with wooden handle, Swiss lake-dwelling. [3]

the slope, the site being indicated in each instance. The principal objects exhibited are ground stone axe-heads, many in their horn sockets, pierced stone axe-hammers (fig. 146), flint knives and scrapers, arrow-heads, bone awls, chisels and knives, barbed harpoon-heads of deer-horn, and bones of animals, some split for the purpose of obtaining marrow.

On the *floor of the Case* may be seen fragments of coarse pottery with impressed ornament, and blocks of sandstone used for grinding stone axes.

On the *top shelf* at the south end of the Case are specimens of textile fabrics woven of flax, fragments of nets, thread, a flint knife mounted in a wooden handle (fig. 147), and a stone axe in its original wooden haft and deer-horn socket (fig. 148).

On the *lower shelf* are boxes containing charred wheat, barley, bread, dried apples, hazel nuts, and raspberry seeds.

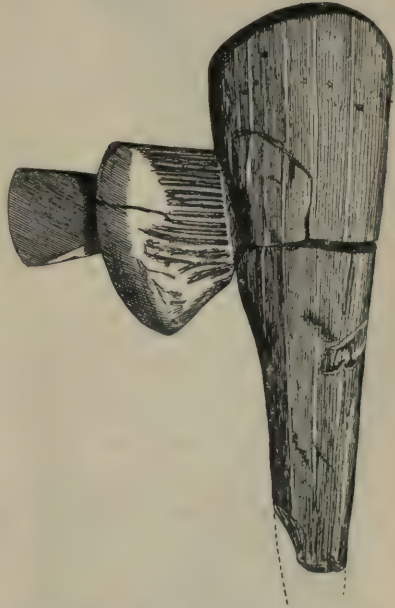


FIG. 148.—Stone celt mounted in antler and wood, Switzerland. [4]

Table case F.

Separate sections are given to Wilts and Yorks, the two most prolific counties in England. Among the objects known to have been derived from primary interments in long barrows, the following may be specially mentioned: four flint javelin-heads (fig. 149) of remarkably fine workmanship from Winterbourne Stoke Down,

and flint arrow-heads from Fyfield and Walker Hill in Wiltshire. From one of the numerous barrows round Stonehenge comes a

particularly fine axe-hammer (fig. 150) much like the Danish axes, and like them probably of the Bronze Age, as a similar specimen was found with metal at Snowhill, Gloucs. (p. 138). Smaller stone axe-hammers in this Case have even been found

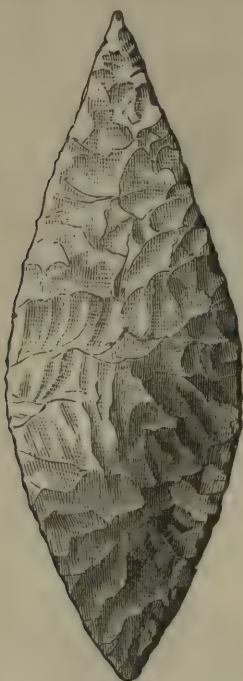


FIG. 149.—Flint point, long-barrow, Wilts.

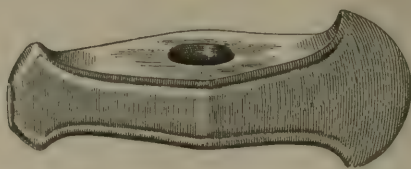


FIG. 150.—Perforated axe-hammer, Stonehenge, Wilts. [4]

with cremated remains at Lambourn, Berks, and at Ganton and Goodmanham, E.R. Yorks.

Fragments of pottery from West Kennet, Wilts, both in form and decoration (figs. 151, 152) differ from the recognised wares of the Bronze Age exhibited in the adjoining Wall-cases 12-30. The majority of these sherds came from the primary burial



FIG. 151.—Neolithic pottery, long-barrow, Wilts.

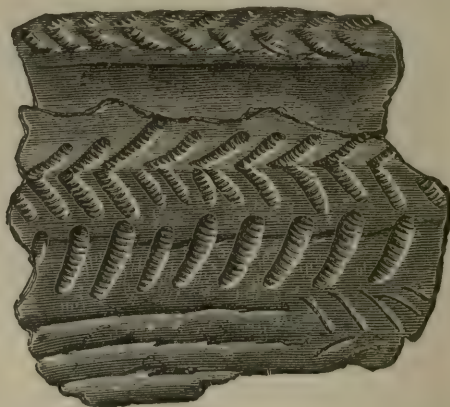


FIG. 152.—Neolithic pottery, long-barrow, Wilts.

in the chambered long-barrow (fig. 153) near Avebury, excavated and described by Dr. Thurnam in 1860. It was then 336 ft. long, 40 ft. wide at the west end and 75 ft. at the east, which was also the higher end (about 8 ft.). The stones projecting from and



FIG. 153.—View of West Kennet long-barrow (restored), from the south, near Avebury, Wilts.

scattered over the mound, being the remains of the sepulchral chamber, were all within 60 ft. from the eastern end, but there was originally a line of upright sarsen-stones all round the foot of the barrow, the spaces between the slabs being filled with dry-walling



FIG. 154.—View along passage into chamber, West Kennet long-barrow.



FIG. 155.—Plan of long-barrow, West Kennet.

in horizontal courses (figs. 154, 155). The chamber and gallery had been originally roofed with stone slabs, some of which were found in position and weighed about a ton each. In the chalk rubble within were found four skeletons with long skulls, probably

the original interments, but others were found with what seems to be later pottery, and the tomb had no doubt been re-opened from time to time. Nearly 300 flint flakes were collected, some being finished tools and most of them milky white; while the sherds were in three separate heaps, but very few pieces of the same vessel were found, and it was clear that the fragments had been subsequently collected. This disturbance of the sepulchral deposits may date from the Roman period, when the chamber seems to have been entered, if not used for burial purposes. The absence of any signs of cremation confirms the view that the original burials belong to the neolithic period, and a date is thus afforded for the pottery, the rest of which is in Devizes Museum. The recent discovery in the Thames at Mortlake (fig. 156) and near Wallingford of hemispherical bowls of the same ware and decoration (fig. 151) supplies the original form of the vessels to which the West Kennet fragments belonged; and the excavation of pre-



FIG. 156.— Neolithic bowl,
Thames at Mortlake. [4]

historic pits at Peterborough by Mr. G. W. Abbott proves that this type preceded, and perhaps overlapped to some extent, the 'drinking cups' of the earliest Bronze Age (*Bronze Age Guide*, 43, pl. v.), which from this and other finds in Haddingtonshire are now known to have been domestic as well as sepulchral vessels.

The neolithic bowl was of thick dark ware with a hollow moulding between the angular lip and shoulder, and was ornamented by pressing a twisted cord or the finger-nail into the clay before baking. The upper half of the vessel was mostly ornamented, and some specimens also have the inner face of the lip decorated in the same style. This last feature is also noticed in the 'food-vessels' of the Bronze Age, which in other respects also closely resemble the earlier ware and seem to have been derived from it, whereas the 'drinking-cup' is evidently a foreign importation (probably from the Rhine), and may represent a conquering race (the short-headed people of the round-barrows) that for a time dispossessed the aborigines of our eastern coasts.

Long barrows are comparatively rare, those in North Wilts and Gloucestershire being the best examples of the chambered type, and the unchambered occurring especially in South Wilts, Dorset, Westmoreland and Yorks. In the last county long barrows have been found by Canon Greenwell containing bodies that had undergone a curious process of cremation, the mound being in fact

erected over flues lined with stones ; but this kind of burial cannot without further evidence be regarded as typical of the neolithic period. The horned cairns of Scotland, the *allées couvertes* (roofed passages) of France, the *Hunebedden* (giants' graves) of Holland, and similar structures in Scandinavia (p. 99) and Portugal confirm the view that this kind of tomb was developed from the dolmen (fig. 161), which is found practically in the same districts.

Table case E.

The *west side* of this Case contains remains from the barrows and dolmens of France, chiefly from the Lukis collection. Brittany is celebrated for its megalithic monuments, and several of the dolmens in Morbihan are here represented. From a chambered long-barrow north of the

stone avenues at Kerlescant, Carnac, come fragments of pottery with herring-bone and finger-nail decoration, also parts of a zoned beaker (drinking-cup), a polished celt, flint arrow-heads and flakes, a pendant and hammer-stone, all apparently of late Neolithic Age (Carnac period, p. 96). A complete 'drinking-cup' of calyx form (French *caliciforme*) is shown, with a different ware spirally ornamented, from a dolmen at Quelvezin (fig. 157), and another similar from a dolmen between Carnac and Plouharnel. In a dolmen on Mané-Remor, Plouharnel, were found flints, quartzite,



FIG. 157.—Zoned beaker, dolmen, Quelvezin, Carnac. [$\frac{1}{4}$]



FIG. 158.—Callaïs pendant, Locmariaquer. [$\frac{1}{2}$]

pottery with a lug, and a small cup with the lug pierced vertically. The larger callaïs (resembling turquoise) pendant (fig. 158) is from a dolmen, Mané-er-Hroecq, Locmariaquer ; and beads of the same material, with a gold ferrule, small celts, flint arrow-heads and flakes, and stone pendants were found in a dolmen at Kerlagat, Carnac. An interesting group from the north dolmen, Mané-er-Kloc'h, Locoal Mendon, includes small ground celts, pottery, a large flint flake and a piece of Roman glass, the last showing that the tomb was entered in Roman times. A dolmen on Mané Bras, north of the stone avenues at Erdeven, Morbihan, produced two polished celts and fragments of a zoned beaker ; while from other parts of France are beads and pendants of shell, bone and tooth from a dolmen in Dépt. Lozère, and

tanged flint arrow-heads from dolmens near Rodez, Aveyron. A view of the well-known Dolmen du Marchand near Locmariaquer, Brittany, shows the interior with carvings on the roof and end-stone, also a plan of the whole structure, which consists of a round chamber, approached by a passage, much like the chamber in West Kennet long-barrow (fig. 154).

In *glazed cupboards* at the end of certain Table-cases in this room are models of dolmens (fig. 159) from Wales and Cornwall, which may be taken as typical of this kind of megalithic tomb, which is found generally near the coast in a long line from India to south Sweden by way of the Mediterranean, the Atlantic coast of Portugal and France, and the English Channel. There are local variations, but the same general form (often with

the same form of beaker) has been found in most of the countries bordering this sea-route, and the problem is to decide in which direction the type travelled. Most authorities are in favour of an eastern origin, though the original home of the dolmen cannot be determined, while others maintain that the northern examples are the earliest, and the custom of erecting such tombs spread southwards and then eastwards along the Mediterranean. In any case there can be no doubt that the type belongs to the neolithic period, and proves a certain connection between their builders throughout the area of their occurrence. Other megalithic forms point in the same direction. For instance, New Grange tumulus, near Drogheda, Ireland, closely re-

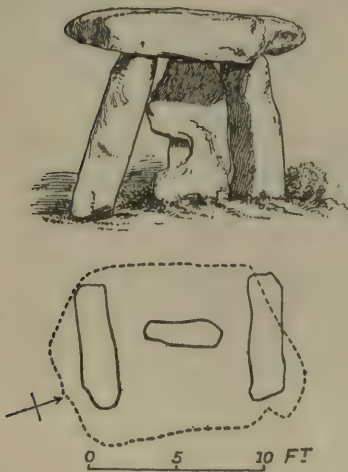


FIG. 159.—View and plan of dolmen, Kit's Coty House, Kent.

sembles, both in form and decoration, that of Gavr'inis in Brittany; and the chambered tomb (though not the dolmen properly so called) extends even to Japan, but as no stone implements seem to have been found in any of the burial mounds of that country, it seems clear that the Japanese had long passed out of their Stone Age before migrating from the mainland.

It may be added that the term 'dolmen' (table-stone) is best used for structures consisting of a large cap-stone supported on upright stones, usually three in number, and it is understood in this sense on the continent, where 'cromlech' signifies a stone-circle, or ring of standing stones, such as Arbor Low, of which a model is shown. The stones are now fallen, but were most probably upright originally, and if isolated would be called menhirs; and their date is suggested by the discovery of flint implements (in the

adjoining Table-case **G** below and also Case **M**) during excavations in 1901-2, and by the fact that a Bronze Age round-barrow has encroached on the fosse which surrounds the stone circle. Arbor Low belongs to the same type as Avebury, Wilts. and both are probably earlier than Stonehenge (see model adjoining), where excavations by Prof. Gowland in 1901 resulted in the discovery of many stone tools, and only a stain of bronze. It was erected probably at the opening of the Bronze Age, and is the most elaborate example of the kind. Sir Norman Lockyer's speculations with regard to its relation to the point of sunrise on Midsummer day are summarised and illustrated on a label; and it is interesting to note that the date he deduces for its erection, from astronomical considerations, coincides with the archaeological evidence, though the latter is mostly negative, and may be modified by further exploration.

In the *glazed ends* of Table-cases **C** and **G** are slabs of stone with markings of unknown meaning, but probably of the neolithic period. The simplest are cup-markings like those scattered over the stone from Carbrach (Aberdeenshire), which are about $1\frac{1}{2}$ in. in diameter with a uniform depth of $\frac{1}{2}$ in. More elaborate examples come from Lilburn Tower (Northumberland) with concentric rings cut about three-tenths of an inch deep; and from Black Heddon, Stamfordham, in the same county, with concentric rings surrounding a pit, usually known as cup-and-ring markings. These are sometimes connected by channels and are specially common in the British Isles, while the simpler cup-markings are found in many parts of Europe, above all in the dolmen area, in Palestine, North Africa and India. They have had a ceremonial or religious significance since the neolithic period, and are found even on the walls of churches. That some are contemporary with the megalithic tombs, on the stones of which they are frequently found, has been indicated by their occurrence in positions not easily accessible, as on the inner walls of passage-graves; but they were no doubt largely produced also in the Bronze Age. On a slab from a cist containing an unburnt body and an urn at Harbottle Peels in Coquetdale (Northumberland) is engraved a figure suggesting the outline of the sole of a foot, 6 in. long; and it may be noted that feet in pairs are represented on rock-faces in Bohuslän, Sweden, along with the more usual boats, men and sun-symbols. The last take the form of a dot and concentric rings, or of a cross within a circle, such as occur on sepulchral pottery and gold discs of the Bronze Age in the British Isles (*Bronze Age Guide*, pp. 51, 58, 152).

Table-case B.

For the study of stone implements, a knowledge of the distinction between natural and artificial fracture is necessary, and in nearly every case the method is unmistakable. By natural fracture is meant the splitting of the flint by some means other than a direct blow from the hand of man; and this may occur before the flint leaves its original bed, through earth-movements that crack and produce 'faults' in the chalk. When exposed on the surface, flints are often fractured by unequal expansion of the mass due to alternate heat and cold; by fire, which does not always imply human agency, but may be due to lightning, friction, spontaneous combustion, or other natural causes; and more especially by frost, when particles of moisture, enclosed in the stone, expand forcibly on conversion into ice. Fall from a height and impact with other stones on a beach are also natural agencies; and a secondary chipping not unlike human handiwork, but solely due to battering by the waves, is often noticed on pebbles of the shore.

The effect on flint of a sharp and somewhat heavy blow, such as that of a hammer, is easily recognised, and may be regarded as proof that the stone has been handled by an intelligent being. A 'bulb of percussion' is the characteristic mark of a worked flint, and is produced on the flake struck off the core (as figs. 118, 124), just below the point where the blow is delivered, but to produce this effect the hammer must fall on a more or less flat surface of flint, and a series of flakes is obtained, one at a time, by striking near the edge of the facet, the bulb of percussion leaving a corresponding hollow (the bulbar cavity) on the core or nodule. The inner or flat face of a flake has, therefore, the bulb at the butt-end, and the outer face shows either the original crust of the flint block, or, if already worked, one or more ribs in the direction of its length, marking the edges of flakes previously struck off.

It is on simple flakes rather than on axe-heads, knives, or arrow-heads that the bulb of percussion is visible, since the majority of implements have been subjected to a secondary process of chipping, in which the blows are neither so heavy nor delivered vertically on a flat surface; so that the original bulb or corresponding hollow is effaced during manufacture. The finer chipping seen on some of the most highly finished specimens is not, however, effected by blows, but more probably by pressure, either by means of a flint 'fabricator' or a tool of bone, wood, horn, or other material (fig. 160).

Palaeolithic implements are often 'rolled,' that is, battered by other stones during the deposit of gravel in a river, and neolithic specimens are often polished all over or at some points; but apart from this many of both ages have their edges softened, the surface

more or less glossy, and the original black or brown of the flint discoloured. These chemical or molecular changes often produce pleasing colour effects and are known as 'patina,' an indication of great antiquity and probably of prolonged exposure to the elements. This alteration of the surface is not necessarily due to contact with the deposit in which the implement is found, otherwise all found in one bed of gravel would be similarly stained. This is no doubt the case with plateau gravel in Kent, where the ochreous patina is practically universal, but it is clear from such deposits as Warren Hill, Suffolk, that the worked flints had acquired their present varied patinations under various atmospheric conditions before being buried in the ancient river-bed. On the other hand, worked flints in a chalky soil usually have a white crust—that is to say,

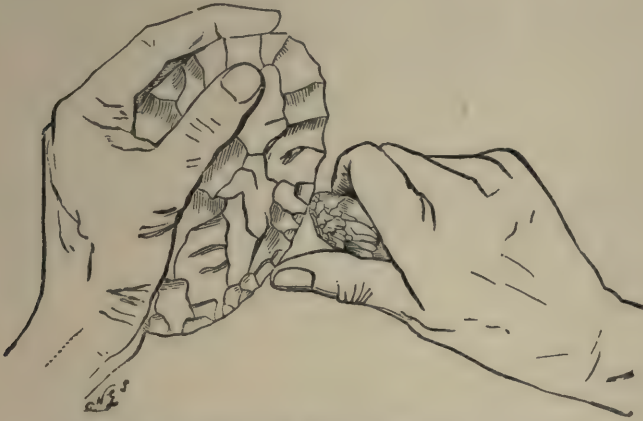


FIG. 160.—Mode of flaking flint by pressure.

decomposition has reached a certain depth, and the altered material is stained by chalk held in solution. A large number of implements have been removed from clay and brick-earth with their surface unaltered in any way, and it is only by their undoubted discovery in certain positions that such specimens can be distinguished from modern productions.

A series of specimens collected by Mr. S. B. J. Skertchley and published in a memoir of the Geological Survey of England and Wales, illustrates the modern methods of flint-working which are found to offer a remarkable resemblance to the processes adopted by neolithic man. The similarity extends to mining the material in the chalk (Cases 125, 126), the form of the pick used by the miners, the shapes of many of the worked flints, and (until recent times, when the French flaking-hammer was introduced), the use of a round-headed hammer. Before the introduction of iron, a pebble of hard stone, such as quartzite, was used for flaking, and the ends of the specimens here shown are bruised in

that way. It is by no means improbable that many of the 'fabricators' belonging to the Stone Age were really used in conjunction with nodules of iron pyrites for producing fire (fig. 94), and it may be pointed out that the gun-flint is only a variety of the domestic strike-a-light.

A small series of palaeolithic implements is here exhibited to illustrate certain characteristics, colours, and surfaces, due in a great measure to their great antiquity, and not to be found in the majority of neolithic implements, which belong to a comparatively recent period. A split specimen will illustrate the difference between the interior and exterior of a palaeolithic implement, and the modern flint-knapper's raw material shows in its white crust the depth to which the flint has decayed and been impregnated with chalk.

In the adjoining section of this Table-case are specimens illustrating methods of hafting, and special attention may be drawn to the neolithic axe, with its original handle now broken and distorted,



FIG. 161.—Stone celt in original haft, Solway Moss. [1]

found in Solway Moss (fig. 161). A cast of the hafted axe found in Ehenside Tarn (Case **131**) is also shown, and a Case containing hafted implements of recent times from savage countries is affixed to the wall adjoining Case **152**.

Central Saloon.

The collection made by Canon Greenwell and presented in 1909 by Mr. Pierpont Morgan consists mostly of Bronze Age antiquities, but a few stone specimens must be mentioned here. In Case **E** is a perforated axe-hammer of elaborate form (much like fig. 150) that was found with a bronze dagger, T-headed pin and one of the earliest bronze spear-heads in this country, with a man's skeleton in a barrow at Snowhill, Gloucs. This discovery confirms the opinion that axe-hammers or battle-axes of this character date from the Bronze period.

In *drawers* accessible to the public under Table-case **D** in the centre of the Saloon are polished and chipped celts from the Thames of various forms and materials, including a pick 12 in. long of the type already noticed (p. 121). A few palaeoliths from Farnham (p. 21), ovates from Warren Hill (pp. 25, 30), and Drift types from Broom (p. 23), the Thames and Dordogne are shown, with an axe-hammer from Auvernier, Switzerland (as fig. 146), a few diminutive celts (as fig. 100) from Asia Minor, and a Danish battle-axe (as fig. 128) and dagger (as plate 5, no. 2).

In Table-case **C** are exhibited amber-beads and other forms (fig. 105) from Denmark, fine arrow-heads from Italy (p. 99) and the Willematte river, Oregon, U.S.A., as illustrations of the art; and an interesting series of cherty flint knives, saws, 'points' and arrow-heads with long curved barbs, said to have been found at Wadi el-Arish (the biblical River of Egypt) between Palestine and Egypt. These are all of Egyptian types, and their resemblance to Danish specimens has been already pointed out (p. 119).

Among the English specimens should be noticed two flint knives like fig. 138; a fragment polished along two edges much in the style of fig. 140; four stone celts and three perforated mace-heads, of 'pestle' and 'cushion' types (p. 122). All these were found at various spots in the bed of the Thames.

Wall-cases 63, 64.

On the opposite or south side of the Central Saloon (on the visitor's right after ascending the main staircase) will be seen in the Wall-cases to the right of the door leading to the Anglo-Saxon collection, a series representing the Stone Age in France, derived chiefly from the Departments of Marne and Aube in the north-east, and from those of Drôme and Vaucluse in the south-east of that country. These objects are exhibited in a separate place because they form part of a large collection, illustrative of all the early archæological periods in France, formed by the late M. Léon Morel of Rheims, and acquired by the British Museum in 1901.

On the *main shelf* is a palaeolithic group from Dépts. Marne and Aube, hand-axes of black flint now covered with a creamy patina, ovate and triangular forms, and a quartzite specimen from Muizon (Marne). On *boards at the back* are worked flakes from the caves at Mentone and from the sites of factories at Villes and Mormoiron (Vaucluse); blades, lance and arrow-heads of leaf and lozenge patterns, and stone beads, all from the cave of Mirabel (Drôme); flint implements and neolithic flakes from neolithic factories at Sompuits, Somsois, Poix, St. Martin, and Sommevesle (Marne). Mainly from a neolithic interment at La

Rochette (Drôme) come fragments of pottery, spindle-whorls, scrapers and arrow-heads, ground stone axe-heads, and bone awls, the body being covered with a massive stone. Another burial at Cloye (Marne) contained a brown flake and necklace composed of discs of pectunculus shell. An interment at Lignon (Marne) contained animal bones split for the extraction of the marrow, and the lower jaws of several children, one jaw being exhibited with flakes, ground stone axes and incised bones, the whole showing traces of fire. In one of the burial pits at Tours-sur-Marne, where human remains were found in great quantity, were also ground flint axe-heads, worked flakes, transverse arrow-heads (as fig. 127), and fragments of human bone discoloured by the bronze bead adjoining them. The presence of a single bronze bead is of interest, as it shows that these pits belong to the transitional period between the Stone and Bronze Ages. Arrow-heads from the Departments of Marne and Aube include British and Irish types, with barbs, tang and shoulder (as plates 4, 10).

Bottom of the Cases: Ground celts of serpentine, diorite, jadeite, chloromelanite, and other stones from the Departments of Drôme and Vaucluse, some of the materials being found in the Alpine area (p. 94). One small specimen is pierced at the butt, probably to be worn as an amulet. A polished celt with squared sides from Vailly (Aisne) is much like some English examples (Case **M**), and a boat-shaped axe-head of diorite found at Charmont (Marne) shows connection with the Danish area (Case **L**). A trimmed flake of flint from Vert-la-Gravelle (Marne) has the unusual length of $8\frac{1}{2}$ in., and a basalt celt of massive proportions comes from Malzéville bridge (Meurthe). A round mace-head of serpentine found near Loriol (Drôme) clearly shows the method of perforation by picking; and a celt from Locras on the Lake of Biemme (Switzerland) is still in its deer-horn handle.

[In the First Vase room of the Department of Greek and Roman Antiquities may be seen the contents of a neolithic house discovered at Magasá in East Crete. The building was rectangular, and consisted of two rooms, the inner and larger room (about 34 ft. by 20 ft.) containing a deposit of polished stone celts. There were also found pottery fragments, three mill-stones, chips of obsidian, a hammer-stone and hollowed pebbles, but no bones, whether worked or unworked. The absence of the finer neolithic ware as found at Knossos, and other indications point to a somewhat early date in the neolithic period, but obsidian had already been imported from Melos.]

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